Mariners Weather Log

Vol. 48, No. 1 April 2004

Last Ship of the 2004 Season, the **Cason J. Callaway**
Entering the Port of Duluth from Lake Superior.
Lake still unfrozen, Water Temperature 42 Degrees F, Air Temperature -22 Degrees F
Photograph by Barb Fuller, Photo courtesy of "www.weatherpictureoftheday.com"

Mariners Weather Log

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From the Editorial Supervisor

Welcome once again to another offering of the Mariners Weather Log (MWL). It has been a long cold winter for some of us, while others just endured a constant drenching from the heavens. Well, down here in southern Mississippi, the birds are singing, flowers are blooming and my kids are already hassling me about opening up the pool - go figure. Just like the seasons, the VOS program has undergone some changes as well. Since we last chatted, Mr. Tim Kenefick, our PMO in Newark transferred to our new Charleston position. This allowed Mr. Jim Luciani to join our ranks as the PMO in Newark. You can read all about Jim and his life so far on page 65. Mr. Larry Cain, the PMO in Jacksonville retired, so Mr. John Warrelmann, our PMO in New Orleans has transferred to Florida. Now we have an opening in New Orleans. Wait a minute, Ms. Paula Campbell has just accepted the position there. I hope you have been keeping your scorecards up to date on all of this. But wait, there's more! Mr. David McShane, our VOS Technical Lead for the past three years has just announced that he is leaving the program to become the Meteorologist in Charge of the Weather Service Office in Williston, ND. I don't think that it is a normal port of call, but we will keep you informed. Once all the dust settles, we will let y'all know all about the newest PMO in New Orleans and officially say goodbye to Dave. I wanted to have a nice send-off article for Larry upon his retirement, but it was his wish to go out on a low-key note. All we can say is "Fair Winds and Following Seas Shipmate - Thanks."

Ok, now back to this issue. I hope you find the stories about the hunt for the U.S. Navy's first submarine, Gulf of Tehuantepec winds, or the weather trouble experienced by some Alaskan Tankers as interesting as I did.

So, as long as you are off watch, go find a snug harbor to prop up your feet, grab some coffee, and enjoy the MWL.

Regards - Luke ⚓

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Some Important Web Page Addresses

NOAA	http://www.noaa.gov
National Weather Service	http://www.nws.noaa.gov
National Data Buoy Center	http://www.ndbc.noaa.gov
AMVER Program	http://www.amver.com
VOS Program	http://www.vos.noaa.gov
SEAS Program	http://seas.nos.noaa.gov/seas/
Mariners Weather Log	http://www.nws.noaa.gov/om/mwl/mwl.htm
Marine Dissemination	http://www.nws.noaa.gov/om/marine/home.htm
U.S. Coast Guard Navigation Center	http://www.navcen.uscg.gov/marcomms/

See these Web pages for further links.

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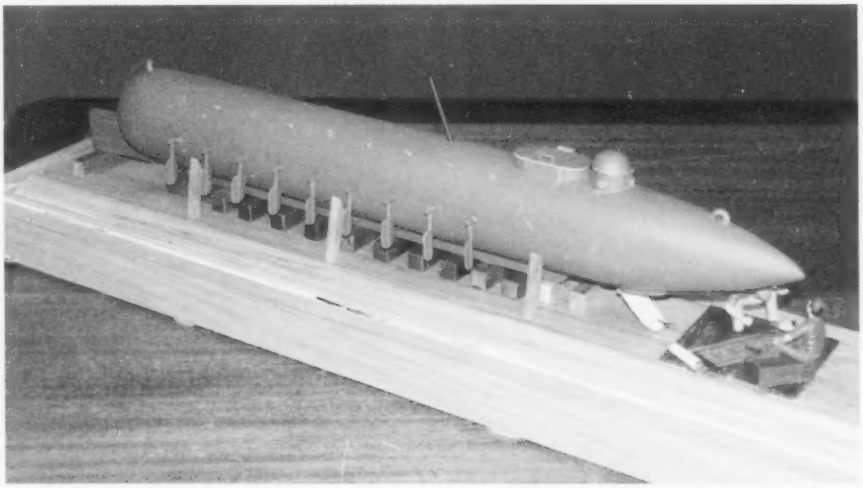
The Hunt for the U. S. Navy's First Sub

David Hall

Reprinted from "The NOAA Report," January 2002, NOAA Office of Public, Constituent and Intergovernmental Affairs, Washington, DC.



Photograph by James Boyle/ONR

Continuing the partnership that led to the successful recovery of the **USS Monitor's** famous revolving gun turret, NOAA and the U.S. Navy have joined forces to uncover the secrets of another technological marvel of the Civil War-era: the **USS Alligator**, the U.S. Navy's first submarine. Built two years before the Confederate sub, **H.L. Hunley**, **Alligator** represented a significant leap forward in naval engineering. However, details about the vessel and its fate have eluded historians for decades. With help from naval historians, maritime archaeologists, oceanographers, meteorologists, ocean explorers, and students, NOAA and the Navy have unearthed new information about **USS Alligator** that is helping to fill large gaps in the history of the all-but-forgotten Union vessel and determine what happened after it was lost in a storm off North Carolina in 1863.

"Through the **Alligator** Project, we are applying our knowledge of oceanography, meteorology, and engineering to solve a mystery of national historic importance," said Daniel J. Basta, director of NOAA's National Marine Sanctuary Program, which houses NOAA's new Maritime Heritage Program. "This project is also about getting people, young and old alike, excited about marine science and exploration and connecting the public to our nation's maritime heritage. It offers the perfect mix of history, mystery and technology."

Today, few are aware of **Alligator** and its place in history. Until recently, its existence was news even to lifelong U.S. Navy submariners, including Rear Admiral (RADM) Jay Cohen, currently Chief of Naval Research.

"I had never heard of the **Alligator**. I had never read about or seen a reference to it. Nothing," Cohen said. It was Cohen's wife who alerted him to it after reading an article about the sub in a Civil War magazine. RADM Cohen was stunned. Most history books cite the **USS Holland**, launched in 1897, as the Navy's first sub. Eager to delve deeper into **Alligator's** story, Cohen shared the article with Basta and ocean explorer Robert Ballard. The admiral knew they would immediately grasp the significance of the submarine to American maritime history and might be in a position to aid in the search for clues into the history and possible location of the long-lost sub.

They soon learned that the **Alligator** was something right out of Jules Verne's *"20,000 Leagues Under the Sea."* Built to counter the threat of Confederate ironclads, the green 47-foot-long, oar-propelled submarine was a vessel like no other. Among its most notable features was an airlock designed to allow a diver to exit the vessel while submerged and place an explosive charge on an enemy ship.

Alligator's design also included an air purification system. Both are standard components of modern sub-

marines. Following its launch from a Philadelphia shipyard in 1862, **Alligator** was tasked with destroying bridges crossing the Appomattox River and clearing obstructions in the James River in Virginia. But to the dismay of its champions, **Alligator** would never get the chance to prove itself in battle. After arriving in the combat zone, its captain and crew discovered that the waters of the James and Appomattox were too shallow to allow the sub to submerge.

The **Alligator** also proved to be less maneuverable than expected. Fearing that it could be captured by the Confederacy, the **Alligator** was withdrawn and towed to the Navy Yard in Washington, D.C., where it was refitted with a hand-cranked screw propeller. President Lincoln himself witnessed a demonstration of the "improved" vessel. After declaring that the **USS Alligator** was ready for action, RADM Samuel Dupont ordered the sub to Charleson, S.C., in March 1863 to assist with the Union blockade of that strategically important city. It would be a fateful journey.

While heading south along the North Carolina coast, **Alligator** and its tow vessel, **USS Sumpter**, encountered a storm so fierce that the **Sumpter's** crew, facing the loss of their own ship, was forced to cut the unmanned submarine loose. The Union sub was never seen again. "We don't know what happened to the **Alligator** after its towline was cut," Basta said. "Did it sink right away? Did it float for days and then sink? Did it wash up on a beach somewhere? Is it still intact or has it succumbed to corrosion?" To help answer those questions Basta enlisted the assistance of faculty and students at the U.S. Naval Academy.

Three decades earlier, Naval Academy instructors and midshipmen had aided in the successful search for another Civil War vessel, the **USS Monitor**.

The academy team formulated a number of theories about the **Alligator's** fate based on the best information available. Basta also looked internally for help. He knew that the key to success was learning more about **Alligator** and the man who invented it, French immigrant and self-described "natural genius" Brutus de Villeroi. Immediately, he thought of the National Marine Sanctuary Program's national partnership coordinator, Catherine Marzin, who hails from Villeroi's native France. Believing French historians might know something about Villeroi and the **Alligator** and knowing that Marzin was already planning to visit relatives in France, Basta presented Marzin with a challenge: Find the blueprints to the **Alligator**!

National Marine Sanctuary Program Director Daniel J. Basta (left), National Partnership Coordinator Catherine Marzin (center) and Education Coordinator Michiko Martin examine the blueprints of USS Alligator, the Navy's first submarine, which Marzin found in France.

Marzin's search for information about Villeroi and the sub led her to the French naval archives outside Paris.

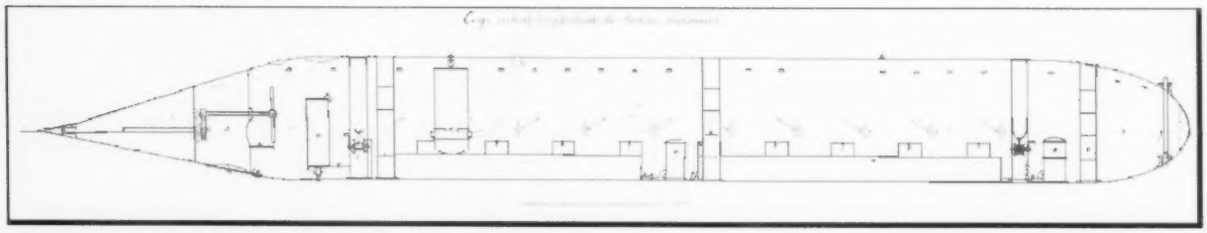
Sure enough, they had a file, or, rather, a box, labeled "System of Naval Construction, Submarine, Blueprints, de Villeroi, 1832-1882." The box contained a complete set of original drawings of **Alligator**, the only blueprints of the submarine found to date. "It was a very exciting moment," said Marzin of her discovery. "It was like hitting the jackpot." With the drawings were a number of hand-written letters exchanged by Villeroi and the French government.

The letters document Villeroi's repeated but unsuccessful attempts to persuade his own country to purchase his submarine designs. The newly re-discovered blueprints are already helping The **Alligator** Project team partners, including NOAA's Office of Ocean Exploration, refine their theories about the vessel's fate. "The blueprints provide information that we can use to calculate how quickly the **Alligator** may have flooded and how fast it may have been going when it hit the sea floor," said the sanctuary program's National Education Coordinator, Michiko Martin, who was one of the Naval Academy instructors involved in the **Alligator** Project before joining NOAA in the fall of 2002. The blueprints and other recent findings by the project team generated a lot of enthusiasm in October 2003 at a first-ever symposium about the **USS Alligator**.

Sponsored by NOAA and the Office of Naval Research and held, appropriately, at the Submarine Force Museum in Groton, CT., the meeting sparked discussion about the possibility of locating and recovering the historically significant vessel.

Alligator Project team member NOAA Lt.(j.g.) Jeremy Weirich, a maritime archaeologist with the Office of Ocean Exploration, said that combining information from the blueprints with other historical and scientific data will "allow us to design a more reliable and systematic survey plan" and "give us a better chance of finding it" should a search begin in earnest. Cohen argued that the search for the **Alligator** would be an excellent test of our ability to find a relatively small object on the sea floor, "in an intelligent way over a reasonable period of time and at a reasonable cost." He said that in the age of ultra-quiet diesel submarines and heightened concerns about the security of our ports and near-shore waters, it's the potential deployment of small, inexpensive submerged weapons that keeps him awake at night. "But if we can find the **Alligator**, we can find anything," he said. The consensus among the symposium's participants was that the hunt itself is as important as actually recovering the craft.

"Whether we find the **Alligator** or not, the **Alligator** Project will help us move ocean science and exploration forward," said NOAA Capt. Craig McLean, director of the Office of Ocean Exploration. "We also will engage, and hopefully inspire, more than a few budding scientists and historians along the way." ⚓



*Blueprint of an early design for the **Alligator**.*
(Image courtesy of the National Marine Sanctuary Program)
NOAA OFFICE of Ocean Exploration.

The Gulf of Tehuantepec Hurricane Force Wind Event of 30-31 March 2003

Hugh D. Cobb, III
Tropical Analysis and Forecast Branch
Tropical Prediction Center - Miami, FL

The Tropical Analysis and Forecast Branch (TAFB) of the Tropical Prediction Center (TPC) has been documenting Gulf of Tehuantepec gale and storm events that have occurred since the advent of Quikscat Scatterometer data in 1999. The Gulf of Tehuantepec averages 16 wind events that are of gale intensity or stronger each winter season (Cobb et al., 2003). Several wind events attained wind speeds exceeding 48-KT storm force. On rare occasions sustained winds reach hurricane force. One such instance occurred 30-31 March 2003. The hurricane force wind event of 30-31 March 2003 was the strongest in the Gulf of Tehuantepec since the inception of Quikscat imagery. A 25 km spatial averaged Quikscat image from the 2358 UTC 30 March 2003 pass (Figure 1) indicated 65 KT winds within a fairly large area of 50-60 KT storm force winds. The higher resolution 12.5 km Quikscat imagery from the same time indicated several wind vectors in the 65-70 KT range.

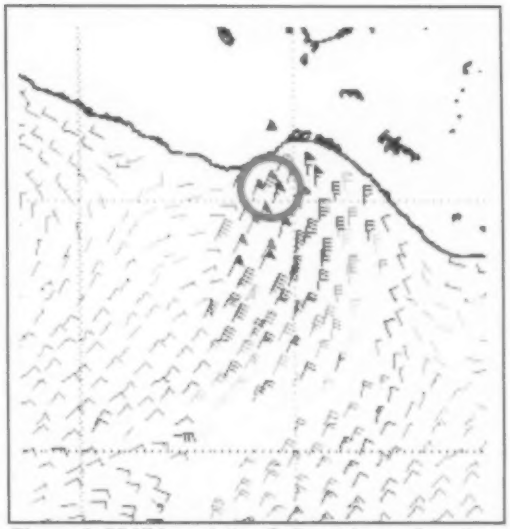


Figure 1. 25 KM resolution Quikscat image from the 2358 UTC 30 March 2003 pass. The red circle contains the location of hurricane force winds.

Setting the Stage for an Extraordinary Wind Event.

The 30-31 March wind event was an extraordinarily strong wind event for the Gulf of Tehuantepec.

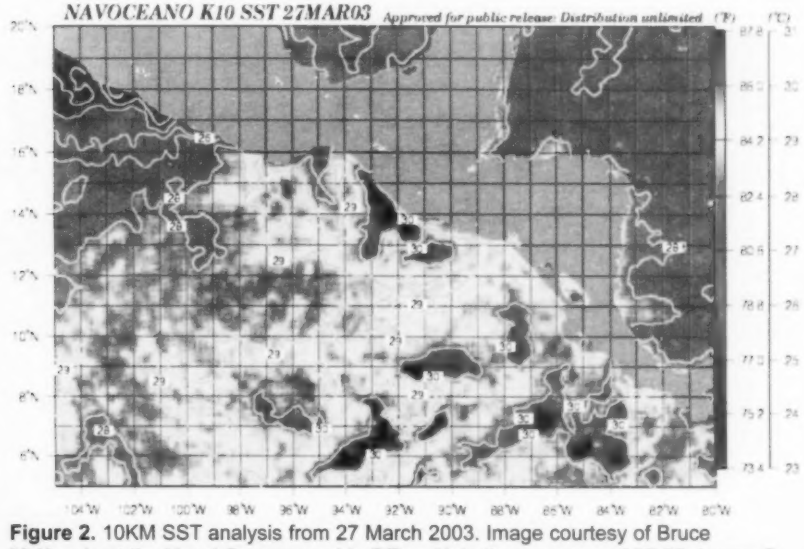


Figure 2. 10KM SST analysis from 27 March 2003. Image courtesy of Bruce McKenzie at the Naval Oceanographic Office. Note the presence of 27-28 degree C SSTs in the Gulf of Tehuantepec.

This was a late season event occurring six weeks after the last documented gale event in the area for the season. The time lag between significant wind events allowed the waters in the Gulf of Tehuantepec to recover from upwelling effects induced by the presence of such strong wind events. A 10 km resolution sea surface temperature (SST) analysis from the Naval Oceanographic Office on 27 March 2003 (Figure 2) indicated STET had reached 27-28C with a pool of greater than 29C water nearby. The potential then existed for winds at higher elevations to mix down to the surface due to the presence of an unstable boundary layer generated by the warm SSTs. In addition ambient surface pressures were 1

to 2-hPa lower in late March than they were in January and February. This effectively added to the potential pressure gradient across the Chivela Pass. Therefore, the potential for much stronger winds existed.

Forecasting a Late Season Tehuantepec Event

The Tropical Analysis and Forecast Branch (TAFB) of the Tropical Prediction Center has high seas forecast responsibility for the tropical eastern North Pacific Ocean from the Equator to 30C N and east of 140C W to the west coast of Mexico and Central America. The High Seas Forecasts are issued four times a day and are a forecast of winds, sea heights and significant weather out to 48 hours. Marine forecasters in TAFB routinely use output from numerical weather prediction (NWP) models to help them forecast marine weather elements (locations of frontal systems and associated weather, wind speed and sea heights) in their area of responsibility. Output from one of the numerical models, the Global Forecast System (GFS) indicated the potential for a strong gale event as early as 28 March 2003. The first High Seas Forecast for the tropical eastern North Pacific to mention the possibility of a gale event in the Gulf of Tehuantepec was issued at 2230 UTC March 28 and indicated winds of 30 to 35 KT would begin in 42 hours, around 1200 UTC 30 March, and increase to 40 KT by 1800 UTC 30 March. At 1030 UTC 29 March 2003 the gale warning was upgraded to a storm warning with gale conditions forecast to begin around 0000 UTC 30 March 2003 and increase to storm conditions by 1200 UTC 30 March with winds of 45 to 55 KT. In the 2230 UTC 30 March 2003 High Seas Forecast, winds were forecast to increase to 60 KT by 0000 UTC 31 March. The forecast increase in winds was based on an observed anticyclone in the 1800 UTC 30 March surface analysis that was 4-5-hPa stronger than forecast by the GFS model. The forecaster took into account the expected impacts of the stronger high on the pressure gradient in the Chivela Pass.

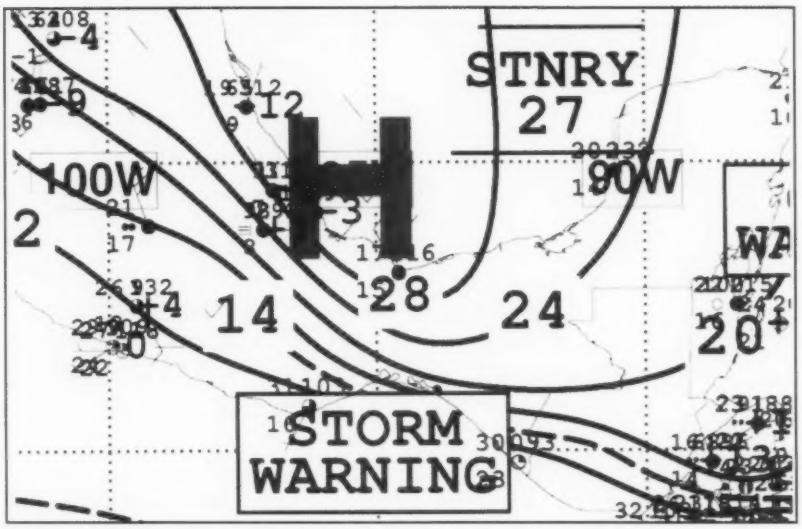


Figure 3. TPC Surface analysis from 0000 UTC 31 March 2003

The Event

A very sharp mid-to upper-level trough had migrated eastward across the southern United States, dragging a very strong cold front deep into the western Gulf of Mexico by 1200 UTC 29 March. By 0000 UTC 30 March, the cold air had entered the northern portions of the Chivela Pass. At the same time, a 1030-hPa surface anticyclone was located over central Texas. The anticyclone had moved into northern Mexico and strengthened to 1035-hPa by 1200 UTC with storm force winds beginning in the Gulf of Tehuantepec. Six hours later the 1036-hPa anticyclone was located on the east coast of Mexico between Tampico and Veracruz with 30 KT northerly winds blowing into the northern end of the Chivela Pass near Coatzacolcos, Mexico. A close up surface analysis at 0000 UTC 31 March 2003 from the TPC (Figure 3) indicated that the strong anticyclone now 1032-hPa had pushed further south over southern Mexico and a surface pressure of 1031.6-hPa was reported at Coatzocolcos, Mexico. A pressure gradient of 16-hPa existed over the 120 nmi length of the Chivela Pass by this time resulting in hurricane force winds within the exit region of the Chivela Pass over the Gulf of Tehuantepec. Salina Cruz reported hurricane force winds with gusts approaching 150 km/h or 75 KT. A vertical wind speed profile obtained from Salina Cruz (Figure 4) indicated winds as high as 70 KT 375 m above Mean Sea Level (200 m above the station). Given the existing instability it is likely that these winds

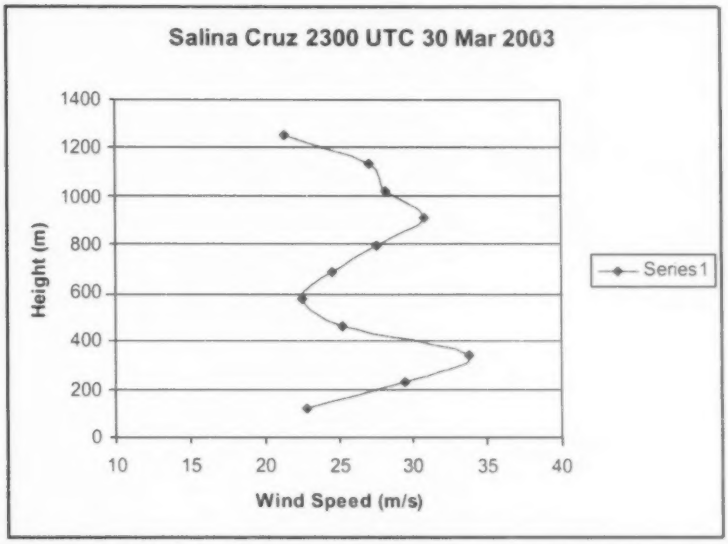


Figure 4. Vertical wind profile from Salina Cruz, Mexico located near the entrance of the Gulf of Tehuantepec from 2300 UTC 30 March. Winds at 375 m above Mean Sea Level (200 m above the station) were near 35 m/s 70 KT.

mixed down to the surface. Storm force winds occurred over a period of 42 hours from 1200 UTC 30 March through 0600 UTC 1 April. Gale force winds occurred over a 78 hour period beginning 0000 UTC 30 March and ending 0600 UTC 2 April. This was also the longest single wind event with storm force winds since documentation of these events began in 1999. The strong winds associated with this event had a marked effect on the SSTs in the Gulf of Tehuantepec. Figure 5 is a 10 km resolution sea-surface temperature analysis from the Naval Oceanographic Office on 1 April 2003 while storm force winds were still occurring. SSTs in the Gulf of Tehuantepec cooled by 4C to 23-24C.

References

Cobb, H.D. III, Brown, Daniel P. and Robert A. Molleda. The use of QuikSCAT Imagery in the Diagnosis and Detection of Gulf of Tehuantepec Wind Events 1999-2002. Preprints 83rd Annual AMS Meeting - 12th Conference on Satellite Meteorology and Oceanography, p. 410.

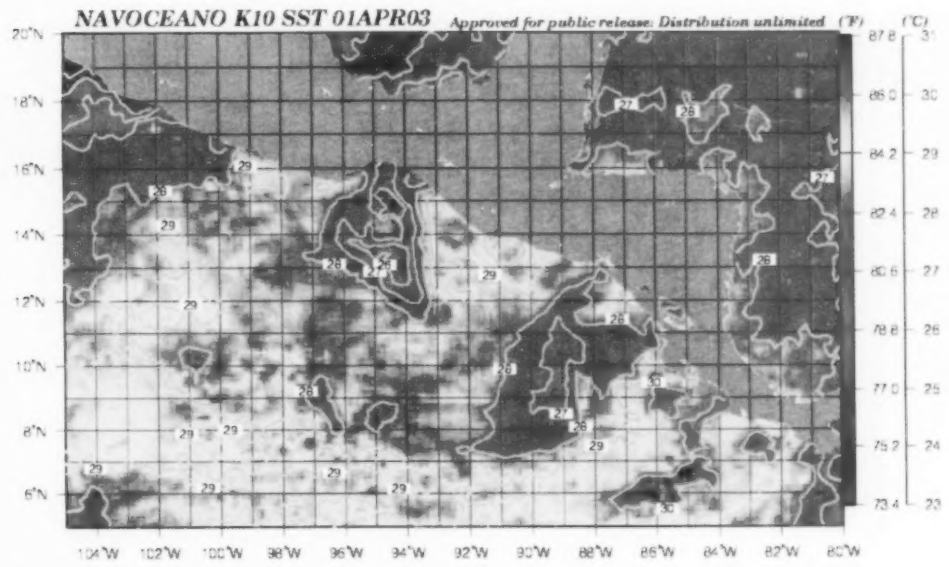


Figure 5. 10KM SST analysis from 1 April 2003. Image courtesy of Bruce McKenzie at the Naval Oceanographic Office. Note the presence of 3-4 degree C cooling of SSTs as a result of the Hurricane force Tehuantepec event.

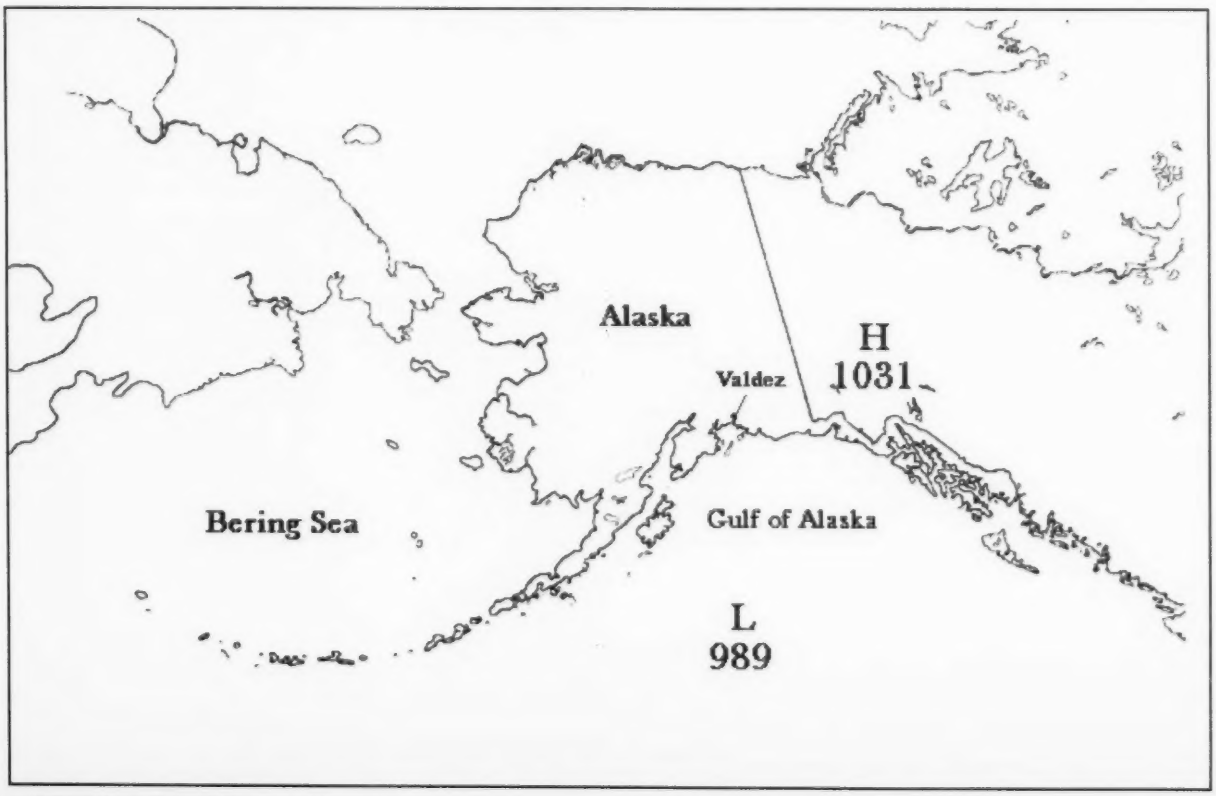
Weather Halts Alaskan Tanker Operations, January 28, 2004

Debra Russell OIC / PMO
Valdez, AK

A strong 1044-hPa High Center migrated eastward across the Alaska mainland the weekend of January 24th eventually coming to rest over the Yukon Territory at 1031-hPa by mid-week. The position of this High combined with a deepening 989-hPa Low Center in the Gulf of Alaska created strong channeled winds out of eastern passages on the south side of the Port of Valdez and through Thompson Pass. Cold air flowing into the area from the Yukon High, dropped ambient air temperatures into the single digits at the Alyeska Terminal and produced sub-zero wind chill temperatures. Gale Warnings and Heavy Freezing Spray Warnings were daily headlines in the Port of Valdez Marine Forecast, as well as for the Valdez Narrows and Arm.

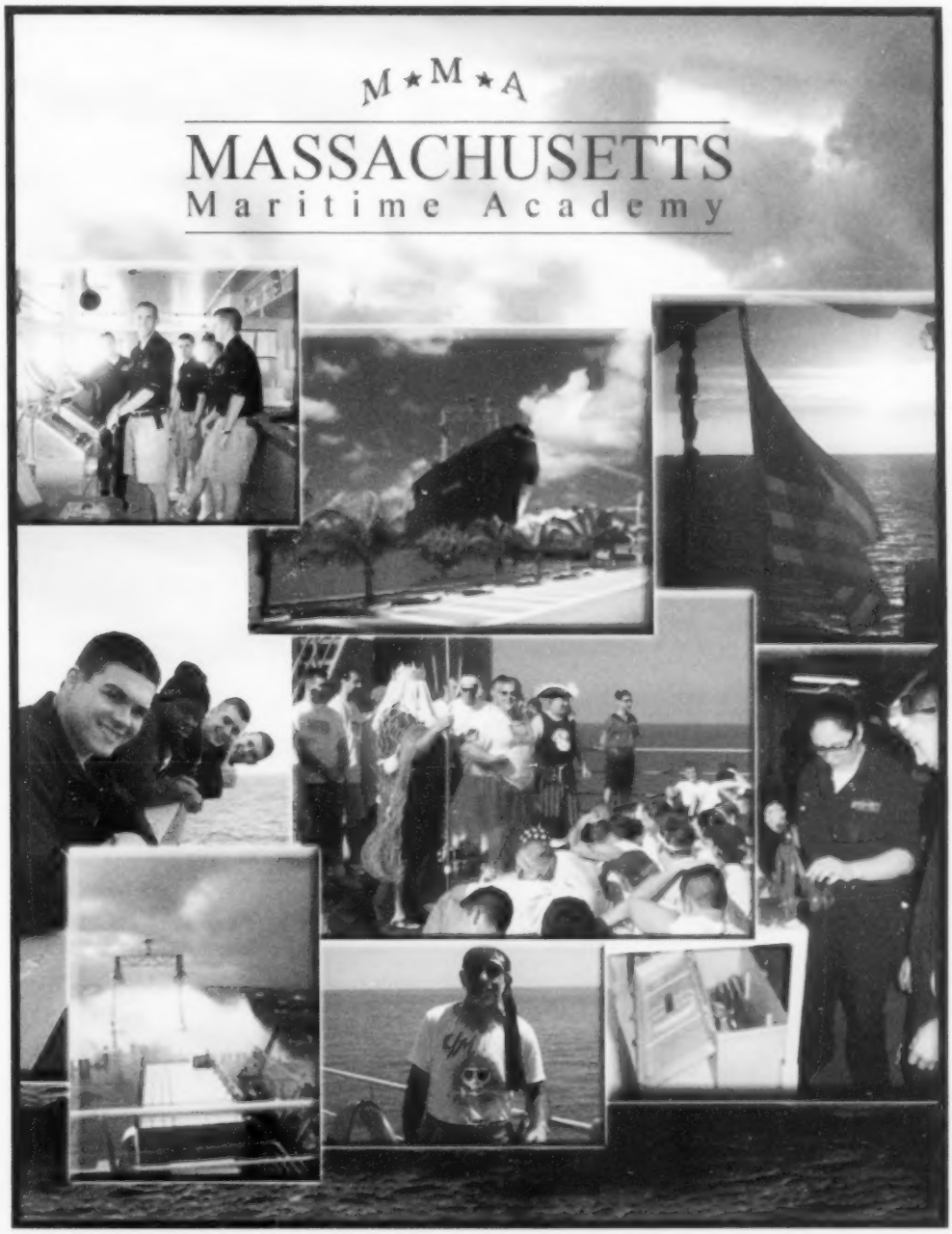
Winds on the south side of the port were sustained around 25 KT with frequent gusts of 35–40 KT according to reports from personnel at the Berth 4 Fueling Dock. The wind speeds themselves were not so much a factor in the shutting down of operations as the wind waves created by the gusty winds. Seas splashing over containment booms created potential spill containment hazards, thus ceasing fueling operations. Winds finally subsided as the High slipped farther eastward allowing operations to fully resume on the morning of the 30th.

The weather shut down combined with previous security shut downs earlier in the month have cost the Tankers about 10 days of fueling during January, which translates into a loss of millions of dollars. ⚓



Maiden Voyage of the USTS Enterprise
Massachusett's Maritime Academy, Seas Term 2004

Photographs Courtesy of Officers, Crews, and Cadets of the Massachusett's Maritime Academy
January and February 2004



Shipwreck: OUTARDE

Skip Gillham
Vineland, Ontario, Canada

While some ships spend their lifetime in relative obscurity, **Outarde** managed to make the news on a number of occasions. In time the ship was a total loss.

The vessel was one of a number of small freighters constructed for Great Lakes service in the United Kingdom during the 1920's. It was launched as **Brulin** at Hebburn-on-Tyne on July 31, 1924, and after loading 2,168 tons of coal, arrived at Toronto on September 29, 1924. The ship was owned by the Montreal Forwarding Company and used to shuttle bulk cargoes from Great Lakes to the St. Lawrence River ports. **Brulin** was ideal for the job as dimensions of 261 feet overall length by 43.1 feet at the beam made her a snug fit in the old locks of the St. Lawrence and Welland Canals.

Trouble started early with a grounding at the head of the Morrisburg Canal in August 1925. This was followed by a collision that sank the tug **Emma L.** and claimed two lives off Windmill Point on the St. Lawrence on July 15, 1926. **Brulin** was bound for

Montreal with 80,000 bushels of wheat when she hit Seven Acre Shoal near Kingston on Lake Ontario on October 16, 1932. The vessel was holed beneath the engine room and 29,000 bushels of cargo had to be removed before the vessel could float free. Seventy-one hull plates had to be repaired in this adventure. On November 16, 1935, the crew of **Brulin** found the tanker barge **Bruce Hudson** adrift in Lake Ontario. The towing tug had left the vessel in the open lake and gone to port for more fuel. The owners of **Brulin** were awarded $9,999 in salvage fees.

In 1939 the vessel was sold to the Quebec and Ontario Transportation Company (Q. & O.) and it was renamed **Outarde**. The parent company of Q. & O. produced newspapers like the Chicago Tribune and they used the ship to bring pulpwood to their paper plant in Thorold, ON and newsprint to their dock in Chicago. Coal and grain were also handled from time to time.

In January 1943, while carrying news-print to St. John's, Newfoundland, the **Outarde** became stranded in the Gulf of St. Lawrence near the French islands of St. Pierre and Miquelon. When released the vessel then spent time carrying coal from Hampton Roads to Boston for the U.S. Maritime Commission and had a 12 lb cannon mounted on the afterhouse for protection.

Outarde was returned to Q. & O. in June 1943 and suffered a serious accident at Clayton, NY on November 30, 1945. A wild storm caught the ship at the Consul-Hall Coal Dock at Clayton, NY and repeatedly pounded the hull against the structure. An exposed piece of steel below the waterline eventually penetrated the hull and **Outarde** sank with a list.

The ship in trouble at left is pictured here thanks to a photo by Geoffrey Hawthorne, courtesy of Daniel C. McCormick. The freighter had to be cofferdamed and the initial salvage in March 1946 lasted only a day before **Outarde** sank again.

Success was achieved on April 18, 1946, and, after repairs at Kingston, **OUTARDE** resumed service in June. By fall the vessel was in trouble again and spent two days aground in the St.. Clair River off St. Clair, MI.
The opening of the St. Lawrence Seaway on April 25, 1959, sent many small lakers into retirement. **Outarde** was sold for scrap but was pressed back into service in 1960 as the **James J. Buckler**.

On June 13, 1960, during the first trip, the vessel stranded on Red Islet Shoal near the mouth of the Saguenay River. The ship was able to back off the perch but was leaking so badly that it had to be beached. The hull was reported to have cracked during salvage operations on June 16 and sank. **Outarde** had been a useful carrier on the Great Lakes, St. Lawrence and Atlantic Coast but it managed to find trouble on a regular basis— and eventually trouble won.

MARINE WEATHER REVIEW – NORTH ATLANTIC AREA
September to December 2003

By George P. Bancroft, National Centers for Environmental Prediction

Introduction

Tropical cyclone activity during this period in Ocean Prediction Center's marine area of responsibility was concentrated during the September to early October period, which included what is normally the peak of the Atlantic hurricane season. Four tropical cyclones affected OPC's area during the period, including one tropical depression and the rest hurricanes. Two of these redeveloped into hurricane-force storms after becoming extratropical. Other tropical activity continued into early December but had little impact on OPC's marine area. Otherwise, extratropical cyclonic activity picked up especially from late October on, with November especially active over the western and central North Atlantic.

Tropical Activity

Hurricane Fabian: Fabian moved north into OPC's high seas area, south of Bermuda, early on September 5 as a major hurricane with maximum sustained winds of 105 KT and gusts to 130 KT. The ship **San Antonio (ELZU6)** north of Fabian near 33N 65W reported an east wind of 35 KT at 1800 UTC September 5. Fabian then passed just west of the Bermuda land station that afternoon where the wind reached an estimated 90 KT with gusts of 115 KT (from the south-southeast) at 1955 UTC September 5 and the pressure dropped to 965-hPa before the station went off the air. After passing Bermuda the storm turned more northeast and accelerated while beginning to weaken, passing about 360 nmi east of the island of Newfoundland early on the 8th while still a minimal hurricane with maximum sustained winds of 65 KT and gusts to 80 KT. The satellite image in Figure 1 shows Fabian beginning extratropical transition while approaching a frontal zone to the north, developing a broad cloud shield north and northwest of the center. The Canadian buoy 44140 (43.8N 51.8W) at 1800 UTC September 7 reported a northeast wind of 31 KT with gusts to 39 KT as Fabian passed to the southeast, with maximum seas 5.0 meters (16 feet) six hours later. The center then passed near the drifting buoy 62711 (47.3N 45.8W), which reported a northwest wind of 70 KT and a pressure of 985.7-hPa at 0700 UTC September 8. This was four hours after the analyzed position of Fabian (based on the 0300 UTC advisory information in the box) in the first part of Figure 2. The cyclone became extratropical after passing 50N later that day. The cyclone then turned north as an extratropical hurricane-force storm early on September 9 before weakening and becoming absorbed by another extratropical storm near Greenland on the 9th.

Tropical Depression Henri: Henri, earlier a tropical storm in the Gulf of Mexico, crossed northern Florida early on September 6 and entered OPC's offshore waters about 120 nmi off the Georgia coast early on the 7th as a tropical depression with maximum sustained winds of 30 KT and gusts to 40 KT. Henri is shown in the first part of Figure 2 approaching a stationary front to the north. Henri then became an extratropical low at 0000 UTC September 9 and became nearly stationary about 150 nmi south of Cape Hatteras, held in place by high pressure building down from eastern Canada.

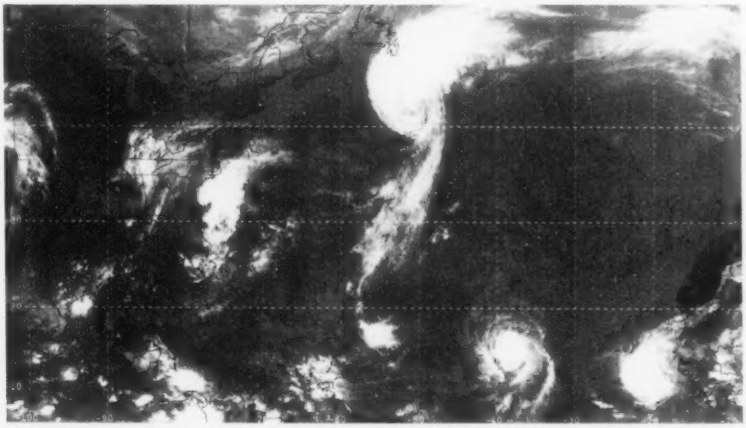


Figure 1. Mosaic image consisting of GOES12 and METROSAT7 infrared satellite imagery valid 1600 IUTC September 7, 2003 showing Hurricane Fabian about twenty-four hours prior to becoming extratropical. The satellite sences temperature on a scale from warm (black) to cold (white) in this type of image. The valid time is eight hours prior to that of the first surface analysis in Figure 1.

Gale-force north to northeast winds developed by then between the remains of Henri and the ridge to the north, which persisted through the 11th. The **Lykes Explorer (WGLA)** and the vessel **Energy Enterprise (WBJF)** reported north winds of 40 KT near 34N 77W and 34N 76W, respectively, at 1800 UTC September 9. The **Lykes Explorer** also encountered northeast winds of 40 KT near 36N 74W atv 1200 UTC on the 10th. The system then began a northwest drift and weakened by the 12th, moving inland over the mid-Atlantic states of the U.S. by September 13.

Hurricane Isabel: Formerly attaining the maximum category of 5 on the Saffir-Simpson scale (Reference 1) while over the tropical Atlantic, Isabel crossed 31N into OPC's marine area about 300 nmi southeast of Cape Hatteras late on September 17 as a large Category 2 hurricane with maximum sustained winds of 90 KT and gusts to 115 KT. Isabel only weakened slightly before making landfall on North Carolina's Outer Banks by the afternoon of September 18 (Figure 3).Ships mainly avoided the storm, with the strongest wind report coming from the **P&O Nedlloyd Nina (MZNM7)**, a south wind of 45 KT at 0600 UTC September 19 near 39N 73W, after the center had passed inland. Reports from some buoys and automated coastal (C/MAN) are listed in Table 1 (next page).

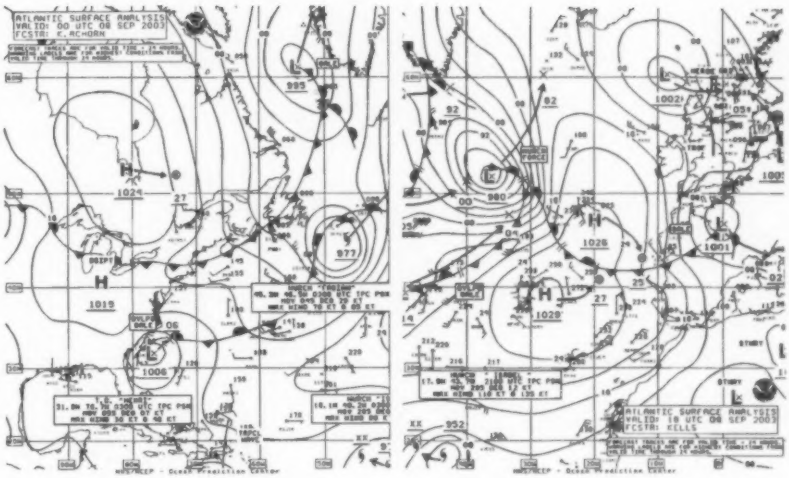


Figure 2. OPC North Atlantic Surface Analysis charts (Part 2 – west, and Part 1 - east) valid 0000 UTC and 1800 1200 UTC September 8, 2003. Hurricane Fabian is depicted becoming an extratropical hurricane-force storm, as well as Tropical Depression Henri off the southeast U. S. Coast. The tropical cyclone information given in the boxes is based on the latest advisory (0300 UTC) and not on the chart's analysis time.

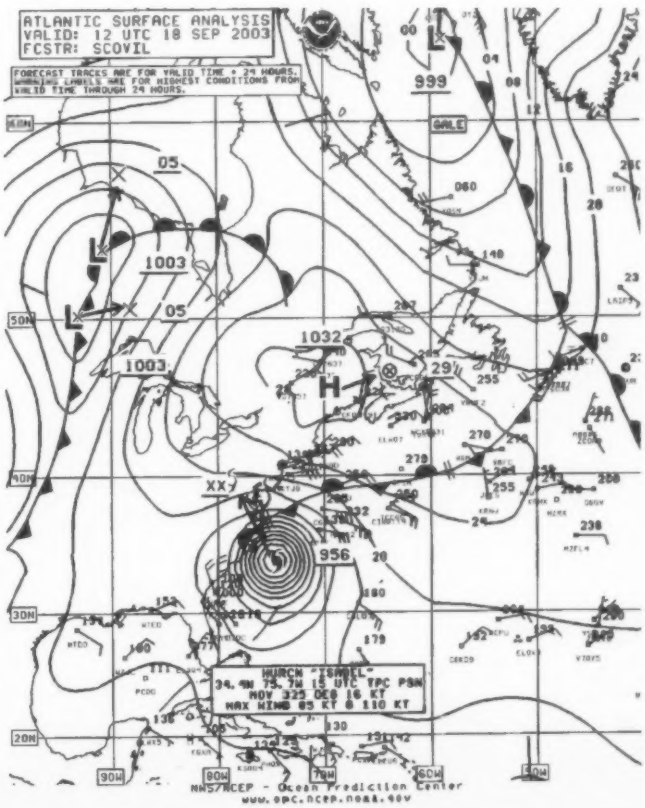

ATLANTIC SURFACE ANALYSIS
VALID: 12 UTC 18 SEP 2003
FCSTR: SCOVIL
FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS.
WARNING LABELS ARE FOR HIGHEST CONDITIONS FROM VALID TIME THROUGH 24 HOURS.
999
1003
1032
956
HURCN "ISABEL"
34.4N 75.7W 15 UTC TPC PSN
NOV 325 DEG 16 KT
MAX WIND 85 KT @ 110 KT
NWS/NCEP - Ocean Prediction Center
www.opc.ncep.noaa.gov

Figure 3. (right) OPC North Atlantic Surface Analysis chart (Part 2) valid 1200 UTC September 18, 2003, showing Hurricane Isabel less than six hours prior to landfall on North Carolina's Outer Banks

Buoy/Station Name/Identifier	Date/Time (UTC)	WIND (direction/ speed/ gust) kt	SEAS (meters/feet)
41002	**18/0300**	**N51 G66**	**9.7/32**
32.3N 75.4W	18/0200		
41001	**18/1400**	**SE45 G58**	**10.1/33**
34.7N 72.7W			
44014	**18/1300**	**NE43 G54**	
36.6N 74.8W			
44009	**19/0700**	**SE33 G43**	**5.1/17**
38.5N 74.7W	19/1900		Max
FPSN7	**18/1800**	**W62 G69**	6.7/22
33.5 77.5W	18/1300	peak G71	
DUCN7	**18/1900**	**SE64 G71**	
36.2N 75.7W			
CLKN7	**18/1500**	**N54 G67**	
34.6N 76.4W	18/1800	peak G71	
CHLV2	**18/2200**	**E64 G70**	
36.9N 75.6W	18/1700	peak NE71	**6.3/21**

Table 1. Some observations taken during Hurricane Isabel

Hurricane Juan: Juan entered OPC's marine area about 180 nmi southeast of Bermuda on the evening of September 25 as a tropical storm and tracked mostly north, gaining hurricane strength while passing about 150 nmi east of Bermuda by the afternoon of the 26th. The cyclone was at a maximum intensity of 90 KT with gusts of 110 KT (a Category 2 hurricane) from the afternoon of the 27th until the next morning, and only weakened slightly while accelerating northward and making landfall in Nova Scotia near Halifax on the evening of the 29th. Figure 4 shows Juan making landfall with maximum sustained winds of 70 KT, but a post-storm analysis by meteorologists at the Canadian Hurricane Center led to an upgrade in strength at landfall to 85 KT sustained winds (a minimal Category 2 storm) (Reference 3). Prior to landfall, Juan passed over the Canadian buoy 44142 (42.5N 64.0W) which reported an east wind of 54 KT with gusts to 68 KT and 8.0-meter seas (26 feet) at 2300 UTC September 28. An hour later the buoy reported a southwest wind of 37 KT with gusts to 54 KT, 12-meter seas (39 feet) and a pressure of 974.7-hPa. Another Canadian buoy (44258) just outside Halifax Harbor reported seas of 9.0 meters (30 feet) and extreme waves of 19 to 20 meters (62 to 66 feet) between 0320 and 0420 UTC September 29 (Reference 4). As Juan was moving into the Gulf of St. Lawrence, the ship **Panuke Sea (VOCT)** (46N 61.5W) encountered southeast winds of 60 KT. The storm then weakened and merged with an extratropical low inland over eastern Canada later on September 29.

Hurricane Kate: Kate, briefly attaining hurricane strength just southeast of OPC's high seas area late on September 29, entered OPC's waters about 600 nmi southwest of theAzores as a tropical storm early on September 30 and drifted northwest until early on October 1 when the cyclone turned more west-southwest and reintensified into a minimal hurricane at 2100 UTC October (maximum sustained winds of 65 KT with gusts to 80 KT) near 31N 42W. Kate passed just south of 31N (OPC's southern boundary) by early on October 2 and continued to intensify, becoming a major hurricane on the 3rd. Kate attained a maximum strength of 110 KT with gusts to 135 KT at 2100 UTC on the 4th just south of OPC's waters near 30N 54W and began a northwest turn.

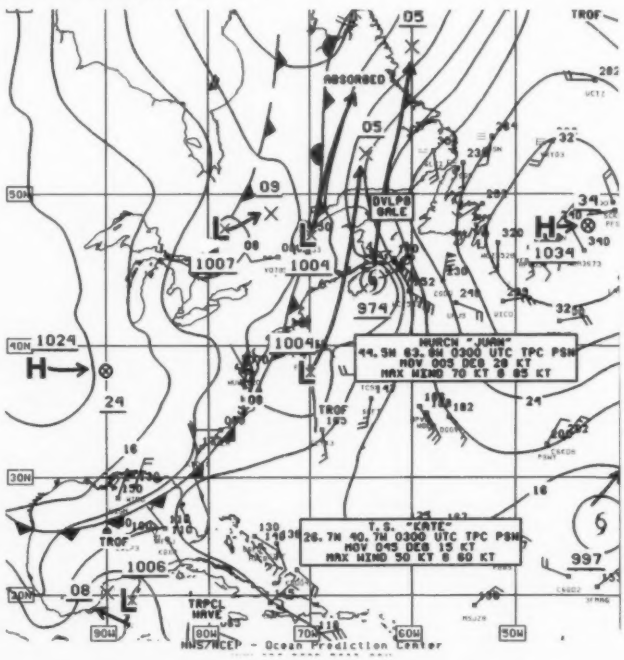


Figure 4. OPC North Atlantic Surface Analysis chart (Part 2) valid 0000 UTC September 29, 2003, showing Hurricane Juan making landfall near Halifax, Nova Scotia, Canada. Also, Tropical Storm Kate appears near the southeast edge of the chart.

Kate then began to weaken upon moving north of 31N again early on October 5. Early on the 6th Kate began to recurve toward the north-northeast and the maximum sustained winds were 80 KT with gusts to 100 KT. The cyclone crossed 40N as a minimal hurricane late on the 6th. The ship **Mackinac Bridge (JKES)** (37N 52W) encountered south winds of 35 KT with Kate passing 180 nmi northwest. Kate then weakened to a strong tropical storm six hours later (maximum sustained winds 60 KT with gusts to 75 KT) while accelerating toward the north-northeast. At 1200 UTC October 7, the vessel **Scandinavian Highway (3EXS4)** (40.5N 50W) reported a southwest wind of 35 KT and 10.5-meter seas (34 feet) following passage of Kate. Kate passed near the Grand Banks oil platforms shortly thereafter, with **VEP717** (46.7N 48.7W) reporting a northwest wind of 51 KT at 2100 UTC October 7. The drifting buoy 44771 (46.0N 48.4W) reported a pressure of 980.1-hPa at 1600 UTC that day. Kate then merged with a frontal zone at 0000 UTC October 8 and became an extratropical hurricane-force storm. Figure 5 depicts this transition with the second part of the figure showing former Kate at maximum intensity while extratropical east of Cape Farewell. The storm was in a data-sparse area, with the scatterometer winds in Figure 6 showing winds to 70 KT in the southern side of the storm. The cyclone turned east at that time and main tained its intensity until after passing south of Iceland on the 9th when the system began to weaken. The remains of Kate moved into Norway late on the 10th.

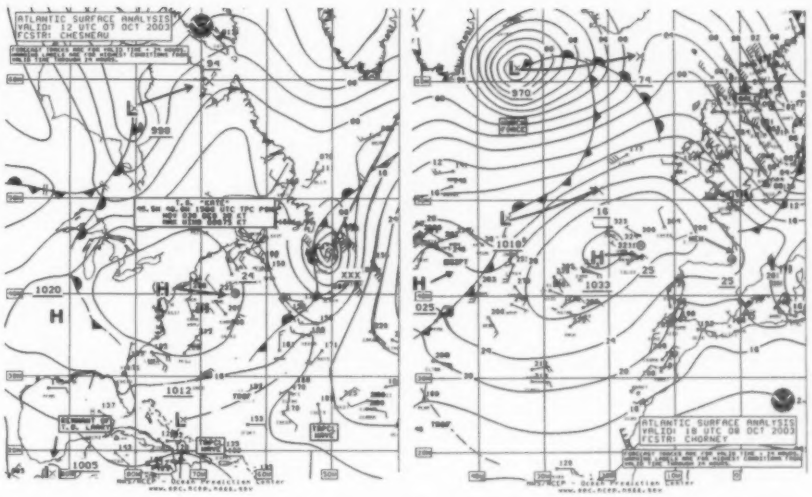


Figure 5. OPC North Atlantic Surface Analysis charts (Part 2 – west and Part 1 – east) valid 1200 UTC October 7 and 1800 UTC October 8, 2003. Tropical Storm Kate is depicted as redeveloping into a hurricane-force extratropical storm.

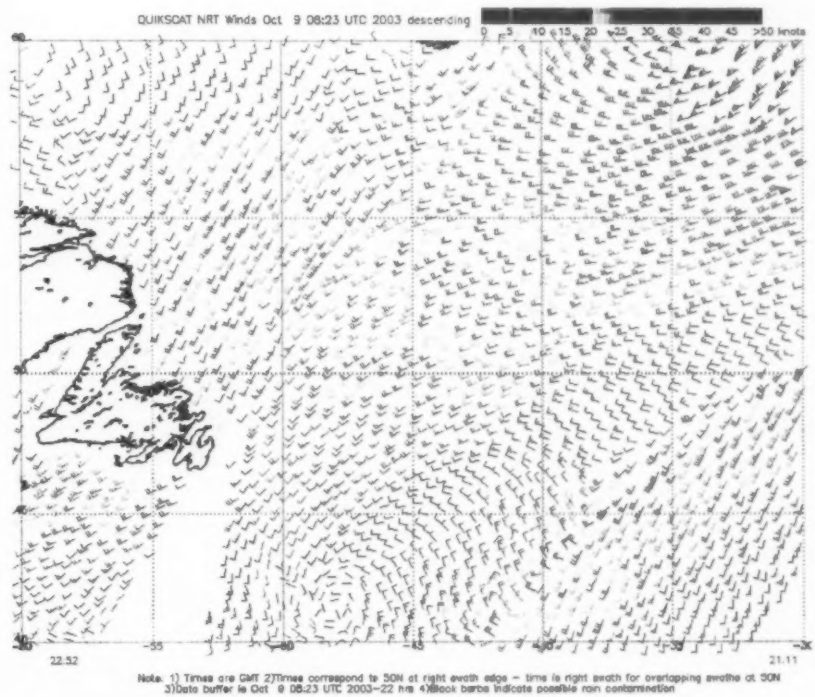

QUIKSCAT NRT Winds Oct 9 08:23 UTC 2003 descending
0 5 10 15 20 25 30 35 40 45 >50 knots
22.52
21.11
Note: 1) Times are GMT 2)Times correspond to 50N at right swath edge – time is right swath for overlapping swaths at 50N
3)Data buffer is Oct 9 08:23 UTC 2003–22 hrs 4)Black barbs indicate possible rain contamination

Figure 6. QuikScat scatterometer image of satellite-sensed winds valid at 2111 UTC October 8, 2003. The valid time of the pass is about three hours after that of the second part of Figure 5. Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

Other Significant Events of the Period

North Atlantic Storm, 11-13 September 2003. There were two early-season storms in the first half of September with central pressures dropping into the mid-960s, unseasonably deep for so early in the season. The stronger of these is depicted in Figure 7, with the low absorbing another low and trailing cold front to the north and rapidly deepening by 34-hPa over the 24-hour period ending at 1800 UTC September 12. The low had originated as a frontal wave about 600 nmi east of the North Carolina coast late on the 9th which broke off from the extratropical remains of Tropical Depression Henri. The lowest central pressure was 964-hPa, reached at 1200 UTC September 13, or 18 hours later than the analysis time of the second part of Figure 7. The cyclone moved into a data-sparse area between Greenland and Iceland, but the QuikScat image in Figure 8 shows some wind barbs of at least 60 to 65 KT on the north side of the storm which was centered to the south off the chart. The system then weakened, passing northeast of Iceland on the 14th.

North Atlantic Storm, 4-6 November 2003. This low, one of the most intense of the four-month period, followed a track that was different from most other systems of similar intensity during the period, initially heading southeast from the island of Newfoundland into an area of considerable ship traffic in the mid-ocean twenty-four hours later, Figure 9. This low was another rapid deepener, dropping 33-hPa in central pressure in the 24-hour period ending at 1200 UTC November 5.

Table 2. Some observations taken during the North Atlantic storm of November 4-6, 2003.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND	SEAS(m/ft)
Zim Iberia (4XFP)	41N 44W	5/0600	NW 58	11.5/37
	41N 45W	5/1500	NW 60	12.5/41
Nedlloyd Sydney (PDHY)	41N 36W	5/1800	W 50	13.0/43
A8CG3	45N 26W	6/1200	NW 60	14.5/47
LARZ5	54N 28W	6/1800	NW 65	3.5/11
Buoy 62108	53.6N 19.3W	6/2200	S 35	12.2/40
VEP7171 (oil platform)	46.7N 48.7W	5/0600	N 56	

The central pressure bottomed out at 960-hPa twelve hours later as the storm made a turn to the north-northeast. Some of the more notable ship reports are listed in Table 2 above.

The convective-type clouds south of the center indicate unstable conditions, favoring the mixing of strong winds aloft down to the surface. The scatterometer image in Figure 11 taken at about the same time shows hurricane-force winds south and southwest of the center (located in data-free swath) with even some 75-KT wind barbs. The cyclone subsequently began to weaken while turning northwest toward Greenland on the 7th, and dissipated over Greenland on November 8.

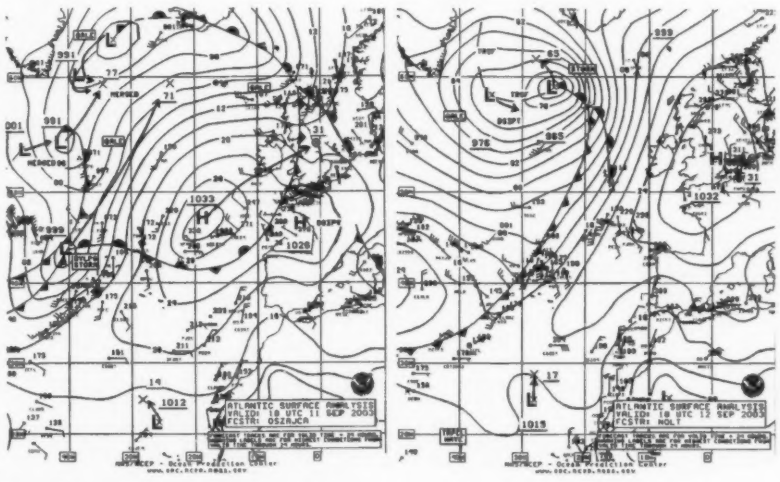


Figure 7. OPC North Atlantic Surface Analysis charts (Part 1) valid 1800 UTC September 11 and 12, 2003.

Figure 10 is a GOES12 infrared satellite picture taken as the storm was approaching maximum intensity. Note the broad frontal cloud bands with cold tops to the north and northeast of the occlusion and warm front as shown in the second chart in Figure 9.

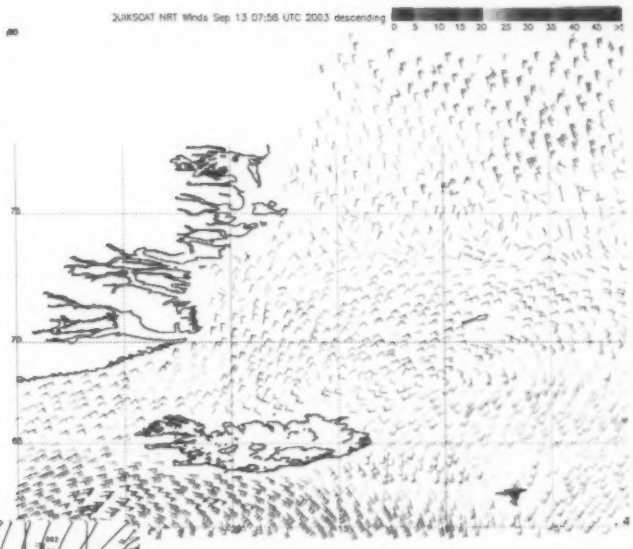


Figure 8. QuikScat scatterometer image of satellite-sensed winds valid at 2035 UTC September 12, 2003. The valid time is approximately two and one-half hours later than that of the second surface analysis in Figure 7. Image courtesy of NOAA/NESDIS/Office of Research and Applications.

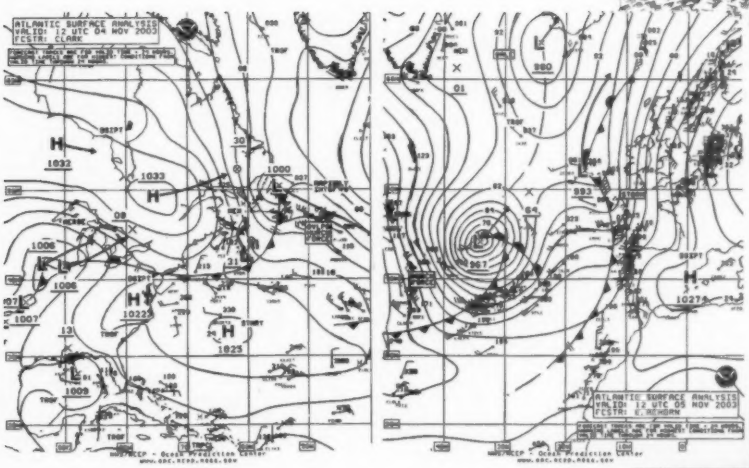


Figure 9. OPC North Atlantic Surface Analysis charts (Part 2 - west and Part 1 - east) valid 1200 UTC November 4 and 5, 2003.

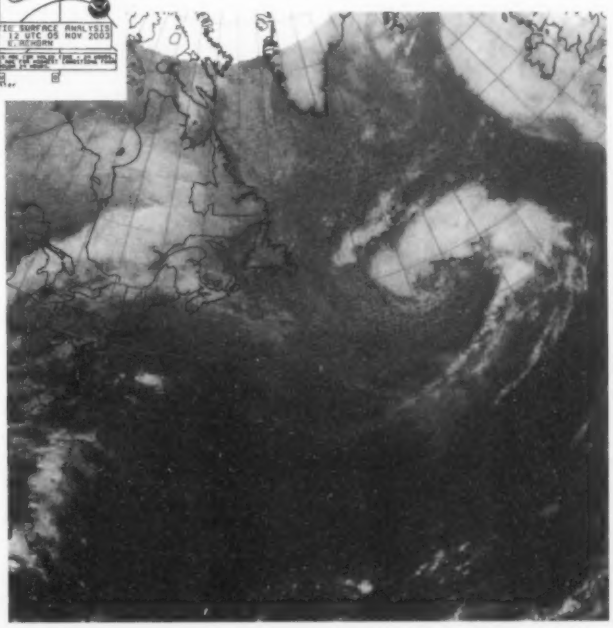


Figure 10. GOES12 infrared satellite image valid 0945 UTC November 5, 2003, showing the hurricane-force storm of Figure 9 approaching maximum intensity. The valid time is approximately two hours prior to that of the second surface analysis in Figure 9.

Western North Atlantic Storm of 9-11 November 2003.

This storm was similar to the preceding storm above in terms of intensity, but tracked more northeast after leaving the coast of Newfoundland, and the strongest winds were closer to the coast of the Canadian Maritimes. Figure 12 shows the system rapidly deepening while moving off the coast, with the central pressure dropping 31 hPa in the 24-hour period ending at 1800 UTC November 9. At 1200 UTC November 9 the **Tampa (LMWO3)** (44N 58W) reported a west wind of 60 KT and 4.6-meter seas (15 feet). Six hours later the Grand Banks oil platforms **VEP717** and **HP6038** reported west winds of 65 KT and 9.8-meter seas (32 feet), and west winds of 60 KT, respectively. **VEP717** then came in with 70 and 75-KT west to northwest winds at 0000 UTC and 0600 UTC November 10, respectively. At 1500 UTC November 10 the drifting buoy 44546 (48N 45W) reported a west wind of 85 KT. Winds obtained via scatterometer during thestorm (not shown) supported winds of at least 70 KT. The central pressure of the storm was as low as 959-hPa at 1200 UTC November 10 when the center was at 53N 42W. The system then began to weaken, becoming a gale-force low while passing south of Iceland on the 12th.

Western North Atlantic Storm of 12-15 November 2003. Much of the intensification of this system was inland while the center was moving across the Great Lakes and St. Lawrence Valley, with Figure 13 showing the storm near maximum intensity. Most of the reports of higher winds and seas were in the west to northwest flow of cold air south of the center.

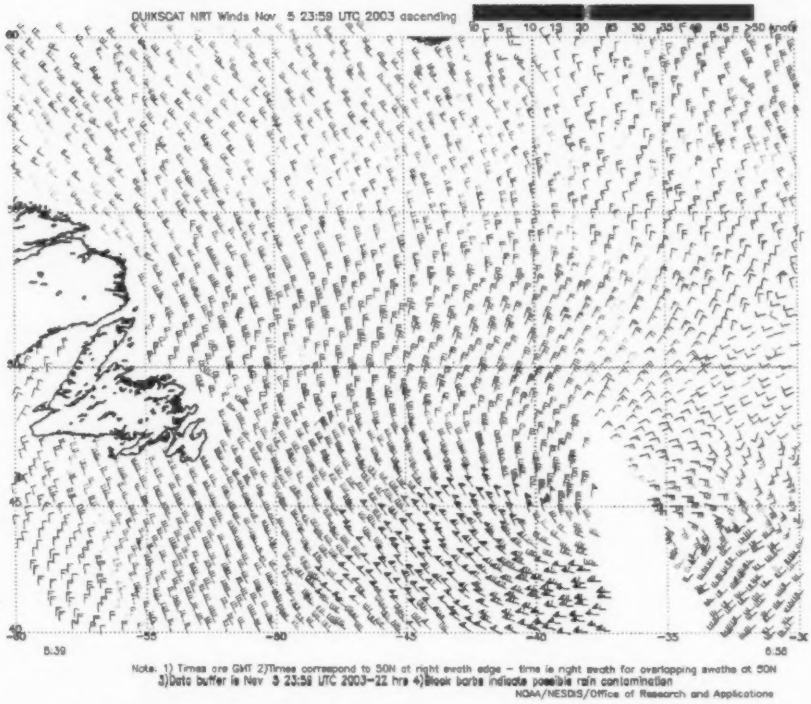

QUIKSCAT NRT Winds Nov 5 23:59 UTC 2003 ascending
Note: 1) Times are GMT 2)Times correspond to SON at right swath edge – time is right swath for overlapping swaths at SON
3)Data buffer is Nov 5 23:59 UTC 2003–22 hrs 4)Black barbs indicate possible rain contamination
NOAA/NESDIS/Office of Research and Applications

Figure 11. QuikScat scatterometer image of satellite-sensed winds valid at 0839 UTC November 5, 2003. The valid time is approximately three and one-half hours prior to that of the second surface analysis in Figure 9. Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

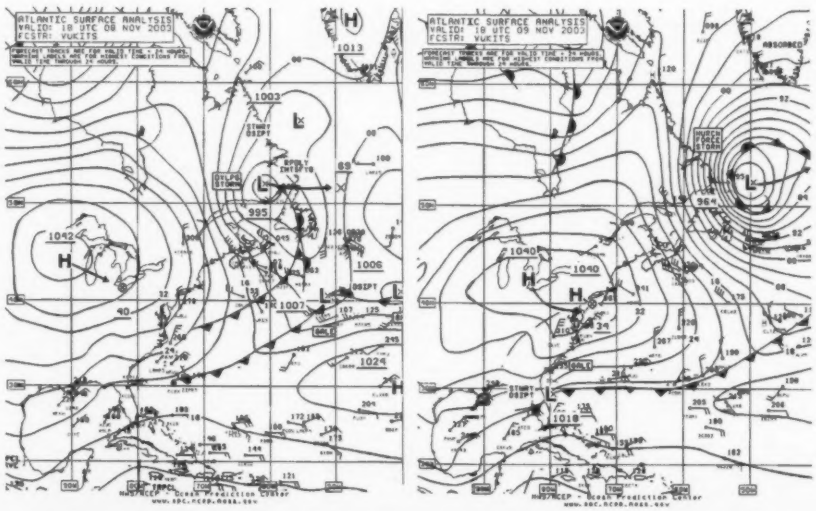


Figure 12. OPC North Atlantic Surface Analysis charts (Part 2) valid 1800 UTC November 8 and 9, 2003.

The ship **Finnfighter (SBFC)** near 39N 69W encountered west winds of 55 KT at 0000 UTC November 14 and 60 KT six hours later. The ship **MSC Italy (ELTN3)** reported west winds of 50 KT and 8.5-meter seas (28 feet) in the Gulf of Maine near 42.5N 68W at 0600 UTC on the 14th, followed by the **Fidelio (WQVY)** encountering west winds of 55 KT near 36N 60W at 0000 UTC November 15. Many of the offshore buoys from off the northern mid-Atlantic coast of the U.S. northeastward through the New England waters and off Nova Scotia reported sustained winds of 35 to 40 KT and higher gusts on November 13 and 14. Buoy 44004 (38.5N 70.5W) reported a sustained wind of 40 KT from the west and 9.4-meter seas (31 feet) at 0200 UTC November 14.

Buoy 44008 (40.5N 69.4W) at Nantucket Shoals reported northwest winds of 39 KT with gusts to 52 KT at 2000 UTC November 14 and seas of 6.5 meters (21 feet). The highest seas or significant wave height came at 0100 UTC on the 14th when the waves reached 8.0 meters (26 feet). Among the C-MAN automated coastal stations, Ambrose Light (ALSN6) near 40.5N 73.7W reported the highest sustained wind and gust, west at 46 KT 1300 UTC November 13, and a peak gust of 61 KT two hours later. The storm system then drifted east over the Labrador Sea on November 15 before weakening to a gale south of Greenland, and then reformed near Iceland by the 20th before dissipating near Great Britain by November 23.

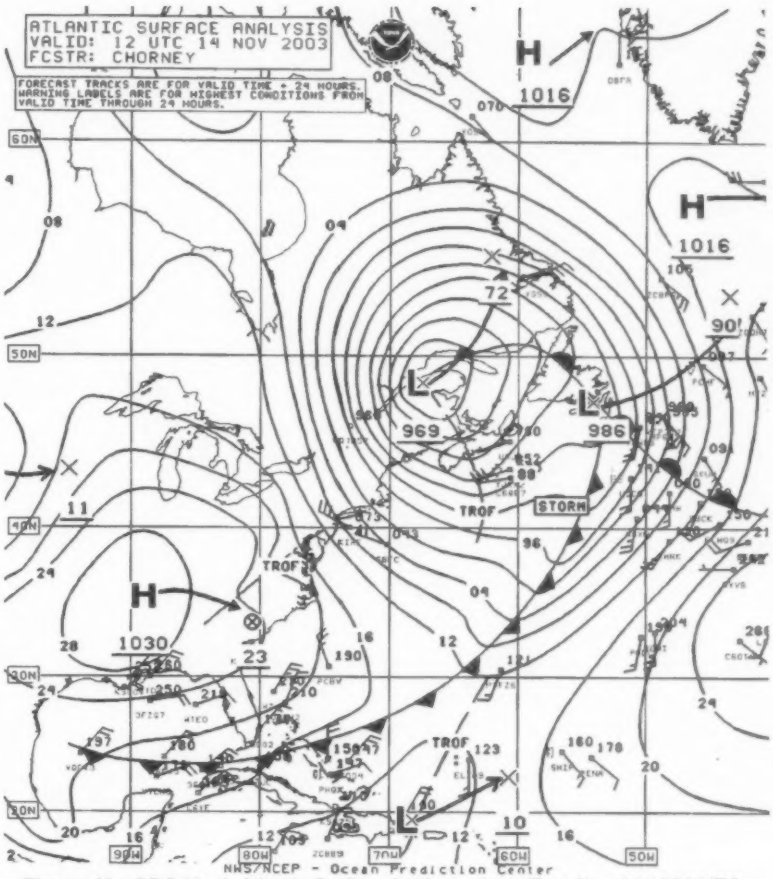


Figure 13. OPC North Atlantic Surface Analysis chart (Part 2) valid 1200 UTC November 14, 2003.

Northwest Atlantic Storm of 29 November 29 -1 December 2003. This storm like the previous one developed inland over southern Quebec early on the 29th but instead took a more northward track into the northern Labrador Sea, developing a brief period of hurricane-force winds against the southwest Greenland coast at 1800 UTC November 30. The central pressure was down to 953-hPa at that time, the lowest in the North Atlantic during this period. The center then weakened and reformed east of Greenland by December 1 before being replaced by another storm lifting northeast from the Canadian Maritimes two days later.

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Vukits, Paul (OPC), E-mail communication, September 20, 2003)

Avila, Lixion A. *Tropical Cyclone Report, Hurricane Juan 24-29 September 2003* (Tropical Prediction Center website, www.nhc.noaa.gov/)

Bowyer, Peter, *The Storm Surge and Waves at Halifax with Hurricane Juan,* Environment Canada Hurricane Center website ww.atl.ec.gc.ca/weather/hurricane/index_e.html). ⚓

MARINE WEATHER REVIEW – NORTH PACIFIC AREA
September to December 2003

by George P. Bancroft, National Center for Environmental Prediction

Introduction

The weather of the period featured tropical activity in the western North Pacific, most of which occurred in September and October, but some activity was noted in November and December. Most of this involved storms recurving north and then northeast into the westerlies near Japan and soon becoming extratropical. Only Parma in late October actually entered OPC's high seas area which is north of 30N and east of 160E, as a tropical cyclone, actually accomplishing it twice (see below). Two of the tropical cyclones redeveloped as hurricane-force storms after becoming extratropical, and are described in this article. Non-tropical weather became more active in October, especially in the east. The period from late November through December was very active, with the most intense storms occurring in this period.

Tropical Activity

Typhoon Maemi: Maemi appeared well south of Japan on OPC's oceanic analysis charts as a tropical storm on September 6, then tracked west-northwest and became a typhoon while passing west of OPC's map area early on the 7th. Maemi struck South Korea before recurving north and then northeast and weakening, and became an extratropical gale crossing northern Japan early on September 13. The remains of Maemi then moved northeast toward the Kamchatka Peninsula, briefly becoming a storm at 0000 UTC September 14, before turning east along 50N and crossing the Pacific with winds of gale force or less, taking a week to do so.

Typhoon Choi-Wan: At the time that the remains of Maemi were moving into the south-central coast of Alaska at 0000 UTC September 21, Typhoon Choi-Wan appeared about 180 nmi south of Japan, heading northeast and becoming extratropical near 41N 157E 48 hours later. The maximum strength as a typhoon was 95-KT sustained winds with gusts to 115 KT while south of Japan, before weakening occurred. The ship **Aquarius Ace (3FHB8)** reported from about 250 nmi southeast of Choi-Wan near 30N 145W with a south wind of 40 KT at 0000 UTC on the 22nd. The remains of Choi-Wan weakened to a gale while passing about 420 nmi south of the western Aleutians early on the 23rd, but reintensified to a storm-force low (979-hPa) near 51N 159W at 1800 UTC on the 24th before weakening onshore in Southeast Alaska on the 25th.

Typhoon Koppu: Tropical Depression 17W appeared on the southwest corner of the OPC oceanic analysis area at 1200 UTC September 25, drifting north-northeast. The cyclone became Tropical Storm Koppu near 21N 139E at 0000 UTC September 27, then a typhoon near 26N 141E 36 hours later. The maximum intensity reached was 90 KT maximum sustained winds with gusts to 110 KT near 28N 142E at 0600 UTC September 29, before weakening and becoming extratropical 24 hours later. Figure 1 shows Koppu about to merge with a frontal zone at 0000 UTC on the 30th, and then become an intense 958-hPa low 24 hours later. The QuikScat image of extratropical Koppu in Figure 2 reveals winds of 60 KT or higher around the west and south semicircles of the center, with a maximum of 75 KT northwest of the center, in a part of the ocean with sparse conventional data. The **Paris Express (DIHE)** reported a north wind of 50 KT at 45N 151E at 0000 UTC October 1.

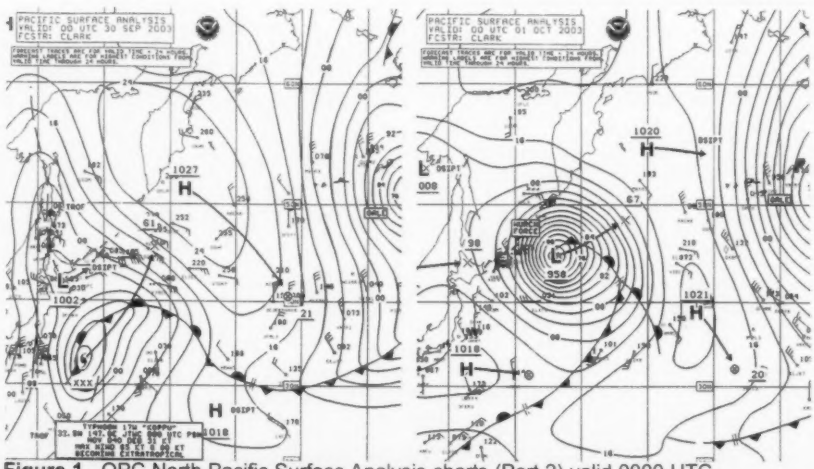

Figure 1. OPC North Pacific Surface Analysis charts (Part 2) valid 0000 UTC September 30 and 0000 UTC October 1, 2003, showing Typhoon Koppu becoming an extratropical hurricane-force storm

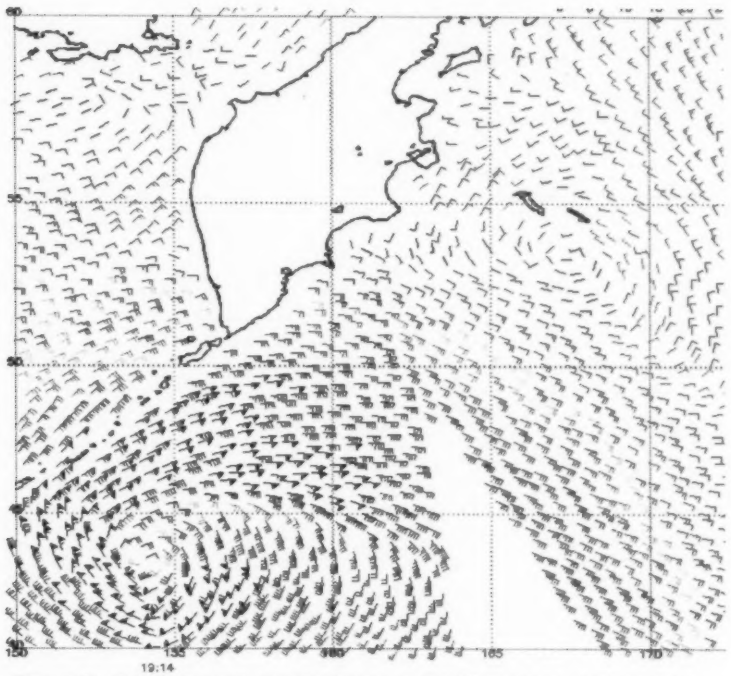

Figure 2. QuikScat scatterometer image of satellite-sensed winds around extratropical Koppu. The valid time of the pass is 1914 UTC September 30, 2003, or less than five hours prior to that of the second part of Figure 1. Image is courtesy of NOAA/NESDIS /Office of Research and Applications.

The storm then began to weaken and turn east, and passed just south of the Aleutians as a gale-force low from the 2nd to the 4th, before moving to the south coast of mainland Alaska and weakening on October 7.

Tropical Depression 19W: This tropical cyclone made a brief appearance as it entered the oceanic analysis area just south of Japan at 0000 UTC October 13, with maximum sustained winds of 25 KT and gusts to 35 KT. The cyclone became absorbed by a frontal zone to the north twelve hours later.

Typhoon Parma: Long-lived Parma originated from Tropical Depression 21W which forme d near 20N 143E early on October 20 and drifted north and then northeast, becoming Typhoon Parma near 24N 147E 48 hours later. Parma continued a northeast track and intensified as a cold front approached from the north, developing maximum winds of 130 KT with gusts of 160 KT upon reaching 31N 162E at 1800 UTC October 24. The front failed to "pick up" Parma and accelerate the cyclone into the westerlies. Instead, Parma looped back to the southeast, then southwest and west along 22N by the 26th. The intensity was down to a minimal typhoon by the 27th before the cyclone turned northwest and reintensified to 85 KT with gusts to 100 KT near 23N 152E at 1800 UTC October 28. On the 29th Parma turned north along 150W, with the intensity increasing to 115 KT sustained winds with gusts to 135 KT as the center reached 27N 150E at 0000 UTC October 30. Parma then turned northeast and weakened as another cold front approached, finally becoming extratropical near 32N 167E at 1200 UTC on the 31st. At this time Parma was an extratropical 993-hPa storm, with a ship nearby **Careen Point (WCY4148)** at 33N 164E reporting a northeast wind of 55 KT. The remains of Parma then weakened to a gale while heading east-northeast on November 2, before turning southeast on the 6th off the U.S. Pacific Northwest coast and dissipating southwest of California on the 11th.

Typhoon Ketsana: Ketsana was short-lived as a tropical cyclone over OPC's map area, appearing south of Japan near 23N at 1800 UTC October 24 while Parma was a typhoon well southeast of Japan. The intensity was 85 KT with gusts to 105 KT, with Ketsana heading northeast and becoming a compact extratropical hurricane-force storm at 0000 UTC October 26. Figure 3 depicts this transformation over a twelve-hour period resulting in the 986-hPa extratropical low east of Japan. The scatterometer data in Figure 4 reveal winds as high as 65 KT southwest of the center. There is a ship east of the center **Mayview Maersk (OWEB2)** near 34N 151E reporting south winds of 45 KT in the second part of Figure 3. The cyclone then moved northeast and weakened to a gale in the Bering Sea on the 28th. The highest wind reported by a ship was a south wind of 55 KT from the **Stimson (WCY2270)** near 52N 180 at 0600 UTC October 28.

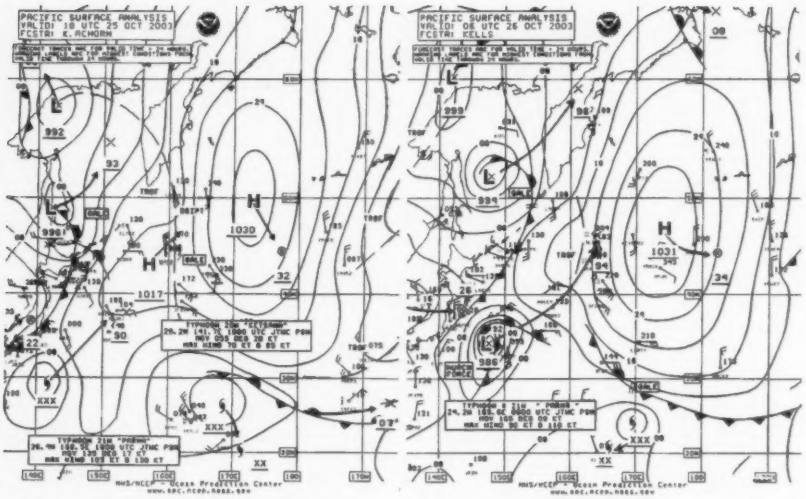

Figure 3. OPC North Pacific Surface Analysis charts (Part 2) valid 1800 UTC October 25 and 0600 UTC October 26, 2003, showing Typhoons Ketsana and Parma, with Ketsana becoming extratropical.

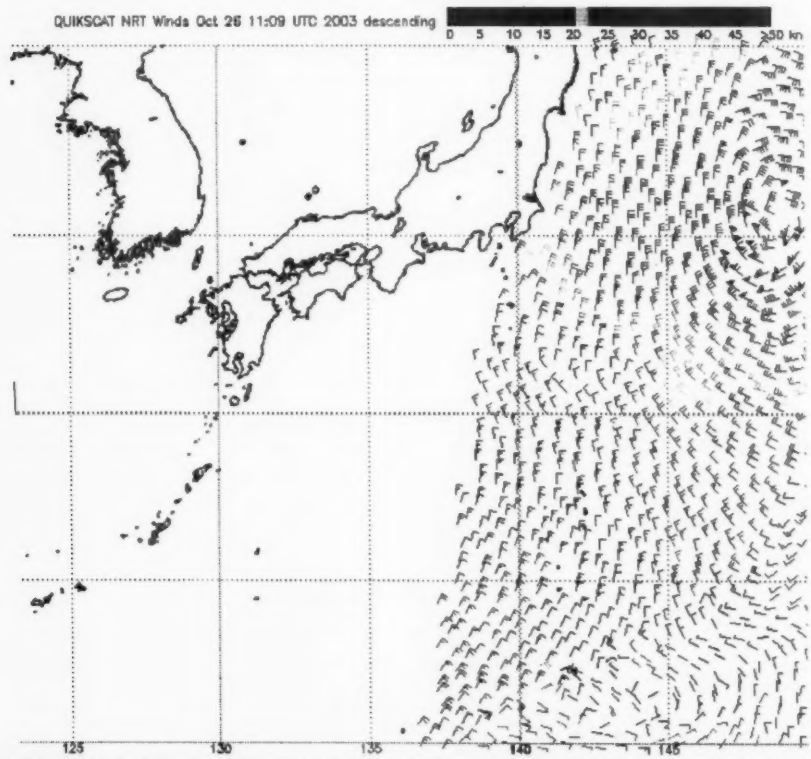

Figure 4. QuikScat scatterometer image of satellite-sensed winds around extratropical storm, formerly Typhoon Ketsana. The valid time of the pass is 0824 UTC October 26, 2003, or less than two and one-half hours later than that of the second part of Figure 3. Image is courtesy of NOAA/NESDIS /Office of Research and Applications.

Typhoon Lupit: Lupit, formerly a super typhoon west of the OPC analysis area on November 27, recurved northeast to near 26N 137W at 1800 UTC November 30 with maximum sustained winds of 70 KT with gusts to 85 KT. Lupit then weakened to an extratropical storm (982 mb) near 31N 143E at 1200 UTC December 1. Re-intensification occurred after 0000 UTC on the 2nd, with the central pressure lowering to 958-hPa and the center moving to near the Kamchatka Peninsula by 0000 UTC December 5. The storm then stalled and weakened over the Bering Sea by the 7th. Available ship reports in the storm were mostly 50 KT around the center until the 4th.

Other Significant Events

Eastern North Pacific Storm, 7-8 October 2003. Figure 5 displays this rapid development of a hurricane-force storm off Vancouver Island from an open frontal wave over a 24-hour period. The second part of the figure shows the storm at maximum intensity (966-hPa). The central pressure fell 28-hPa in the 24-hour span of the figure. The second part of the figure shows the storm at maximum intensity (966-hPa). The central pressure fell 28-hPa in the 24-hour span of the figure. The ship **ZIM Israel (4XGX)** reported a west wind of 50 KT near 48N 134W at 1800 UTC October 8 and again at 0000 UTC on the 9th near 48N 132W, with the latter having 15-meter seas (51 feet). The **Sea-Land Anchorage (KGTX)** encountered north winds of 40 KT and 10.5-meter seas (34 feet) near 52N 135W at 1800 UTC October 8. The Canadian buoy 46132 (49.7N 127.9W) reported a southeast wind of 45 KT with gusts to 56 KT and 5.5-meter seas (18 feet) at 1200 UTC on the 8th, and maximum

seas 10.5 meters (34 feet) thirteen hours later. The maximum wind reported by a buoy was a northwest wind of 52 KT with gusts to 70 KT from the buoy 46036 (48.4N 133.9W). The highest seas reported by this buoy was 10.0 meters (33 feet) at 1500 UTC October 8. Buoy 46005 (46N 131W) reported a peak gust of 64 KT from the south at 0700 UTC on the 8th, and maximum significant wave heights of 12.0 meters (39 feet) at 1800 UTC on the 8th. The QuikScat data in Figure 6 reveals winds of 65 and 70 KT south and southwest of the storm center near the time of maximum intensity. The storm then moved inland and weakened by the 9th.

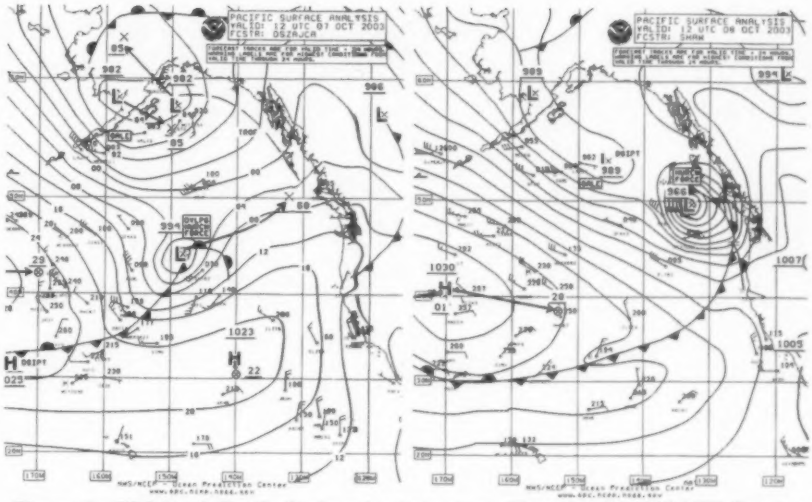

Figure 5. OPC North Pacific Surface Analysis charts (Part 1) valid 1200 UTC October 7 and 8, 2003.

Eastern North Pacific Storm of 10-11 October 2003. A second storm followed a track similar to that of the storm above, and was almost as deep, developing a lowest pressure of 970-hPa near 49N 136W at 1200 UTC October 11. The ship **APL Singapore (WCX8812)** encountered southwest winds of 55 KT and 9.5-meter seas (31 feet) near 43N 138.6W at 0600 UTC on the 11th. Twelve hours later the same ship reported west winds of 35 KT and 12.0-meter seas (39 feet) at 44N 140w at 1800 UTC October 11.Buoy 46005 (46N 131W) at 2300 UTC October 11 reported a southwest wind of 39 KT with gusts to 54 KT and 11.5-meter seas (38 feet). Maximum seas at this buoy were 13.0 meters (43 feet) at 0300 UTC October 12. To the south, winds at the coastal buoys along the Washington and Oregon coasts only topped out in the 30s in gusts, but swells reached 9.5 meters (31 feet) at Buoy 46029 (46.1N 124.5W) at 0900 UTC October 12.This storm then moved inland over Vancouver Island and weakened early on the 12th.

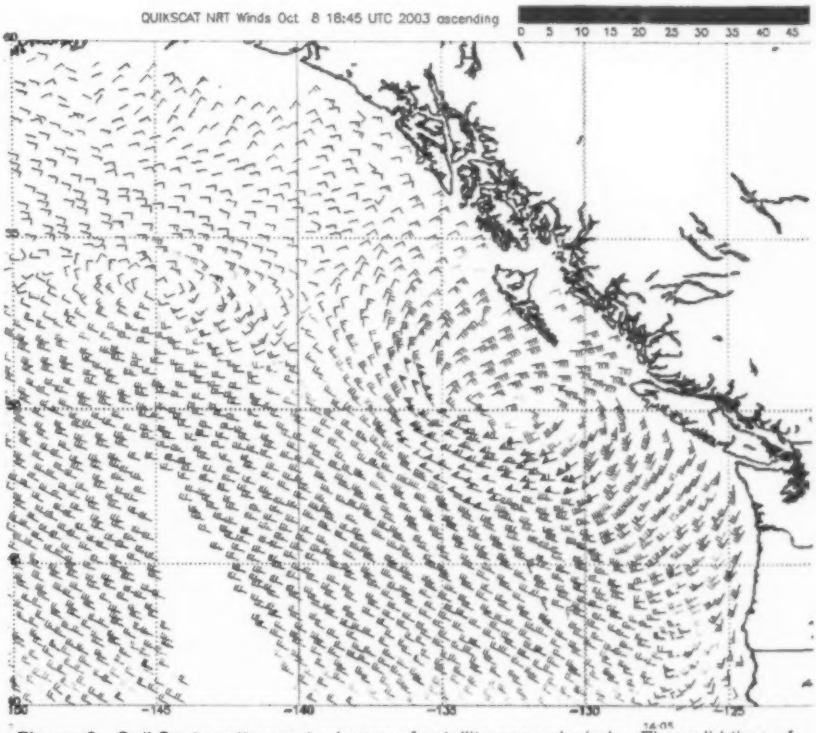

Figure 6. QuikScat scatterometer image of satellite-sensed winds. The valid time of the pass is 1405 UTC October 8, 2003, or about two hours later than that of the second part of Figure 5. Image is courtesy of NOAA/NESDIS /Office of Research and Applications.

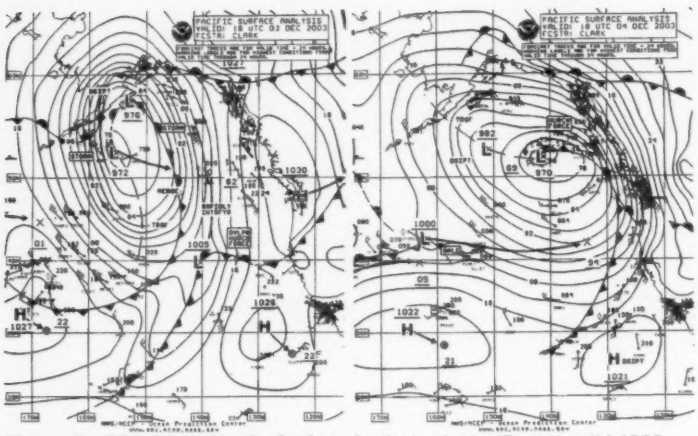

Figure 7. OPC North Pacific Surface Analysis charts (Part 1) valid 1800 UTC December 3 and 4, 2003.

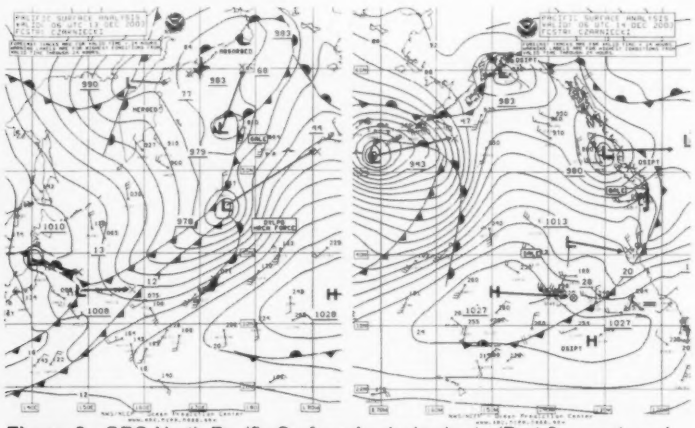

Figure 8. OPC North Pacific Surface Analysis charts (Part 2 – west, and Part 1 - east) valid 0600 UTC December 13 and 14, 2003.

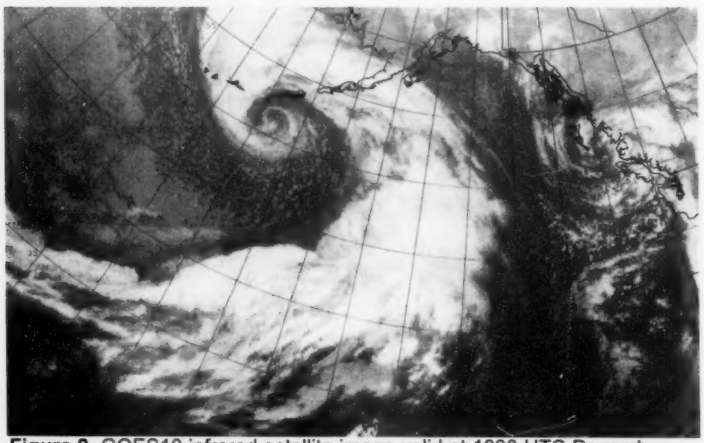

Figure 9. GOES10 infrared satellite image valid at 1030 UTC December 14, 2003, showing storm of Figure 8 near maximum intensity. Satellite senses temperature on a scale from warm (black) to cold (white) in this type of imagery.

Eastern North Pacific Storm of 3-6 December 2003. This storm was noteworthy because of the rapid intensification and some impressive ship reports. Figure 7 displays this development over a 24-hour period from the merger of a low coming up from the south and a larger northern storm system dropping southeast from Alaska, with the pressure of the southern low dropping 35-hPa. The result is the hurricane-force low west of British Columbia with a very strong occluded front approaching the coast. The **President Adams (WRYW)** reported an east-southeast wind of 80 KT near the front (49N 133W) at 1200 UTC December 4, while the **Horizon Kodiak (KGTZ)** encountered an east wind of 65 KT at 1800 UTC on the 4th (plotted in Figure 7). At the same time the **Santa Barbara (ELOT3)** experienced east-southeast winds of 60 KT near Vancouver Island. The storm subsequently stalled near Vancouver Island and weakened by the 7th.

North Pacific and Aleutians Storm of 13-15 December 2003. This was the most intense of a series of storms that tracked northeast across the North Pacific with many turning east and beginning to weaken after reaching the Aleutians. Figure 8 shows the deepest of these, attaining a 943-hPa central pressure (27.85 inches) upon reaching the central Aleutians. This was the deepest low of the period in both oceans. The system was labeled hurricane force by OPC on the 14th. Available sparse ship data showed 50 to 55 KT with **Swift Arrow (C6NI7)** (49N 179W) reporting northwest winds of 55 KT at 0000 UTC December 14. QuikScat data was available for this storm and showed 65 KT south of the center (not displayed here) but was similar to data from a storm of similar intensity that occurred on December 17 farther west (Figure 11).

A satellite image of this storm near maximum intensity (Figure 9) reveals the well-defined center marked by frontal clouds with relatively cold tops wrapping around the center near 51N 168W. The storm subsequently weakened to a gale in the Gulf of Alaska by the 16th, followed by dissipation over Alaska by the 18th.

North Pacific Storm of 16-18 December 2003. This system originated near Japan like the previous one and tracked north-northeast to the western Aleutians on the 17th where it developed a 946-hPa central pressure. The largest pressure drop in a 24-hour period was 39-hPa in the period ending at 1200 UTC December 17. The ship **DGDD** (48N 155E) reported a northwest wind of 55 KT at 0600 UTC December 17. QuikScat winds shown in Figure 11 reveal 65 KT south of the western Aleutians. The cyclone then turned east and weakened, and became absorbed by another storm to the southeast on the 20th.

Eastern North Pacific Storm of 16-18 December 2003 This was an intense system associated with the southern branch of the jet stream, originating from a frontal wave out near the dateline on the 15th. Much of the development occurred at relatively far southern latitudes, west of California (Figure 10). This occurred concurrently with the northern storm above. The second part of Figure 10 shows the storm at maximum intensity. The strongest winds as reported by ships occurred at this time and in the twelve hours following. The ship **P&O Nedlloyd Southhampton (XBC6)** (36N 142W) reported south winds of 60 KT at 1800 UTC

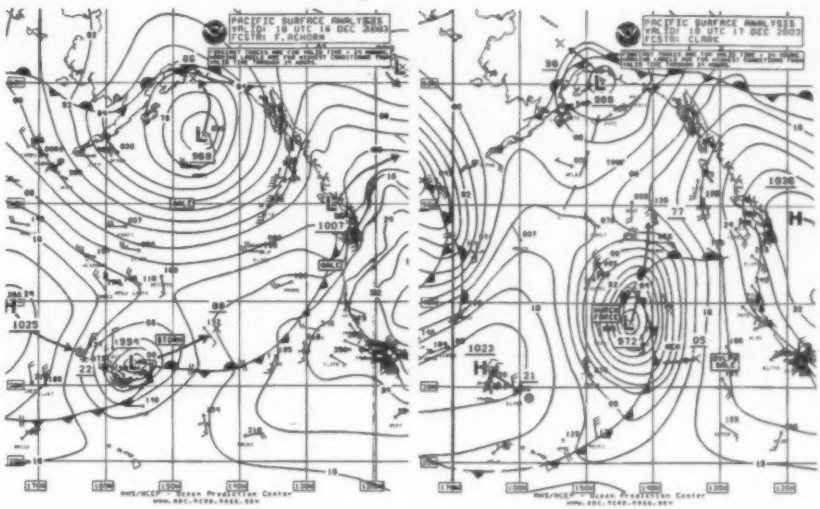

Figure 10. OPC North Pacific Surface Analysis charts (Part 1 - east) valid 1800 UTC December 16 and 17, 2003.

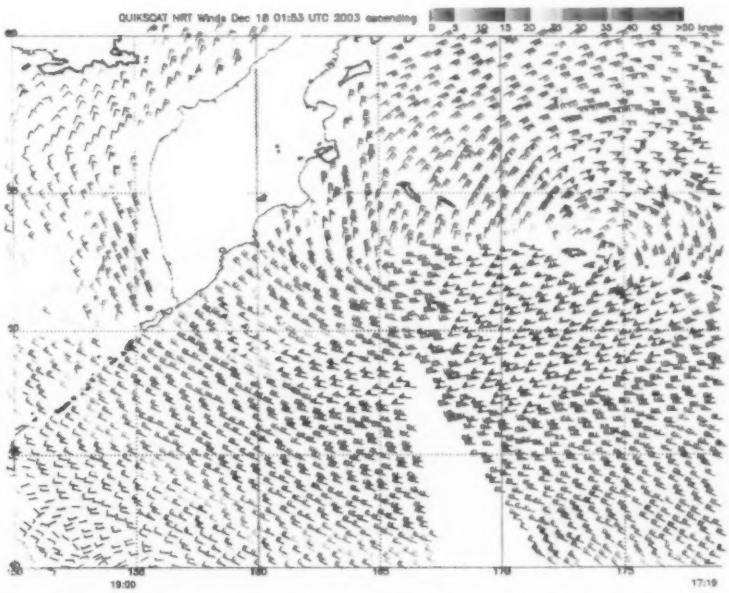

Figure 11. QuikScat scatterometer image of satellite-sensed winds around a storm of similar intensity which immediately followed the storm shown in Figure 8. The valid time of the pass is 1719 UTC December 17, 2003. Image is courtesy of NOAA/NESDIS /Office of Research and Applications.

December 17, followed six hours later by a report of a north wind of 75 KT from the **Clementine Maersk (OUQK2)** (42N 146W) and by **Saga River (LAJY4)**, near 43N 146W at 0600 UTC on the 18th with north winds of 60 KT The system then lifted north-northwest into Alaska on the 19th and weakened.

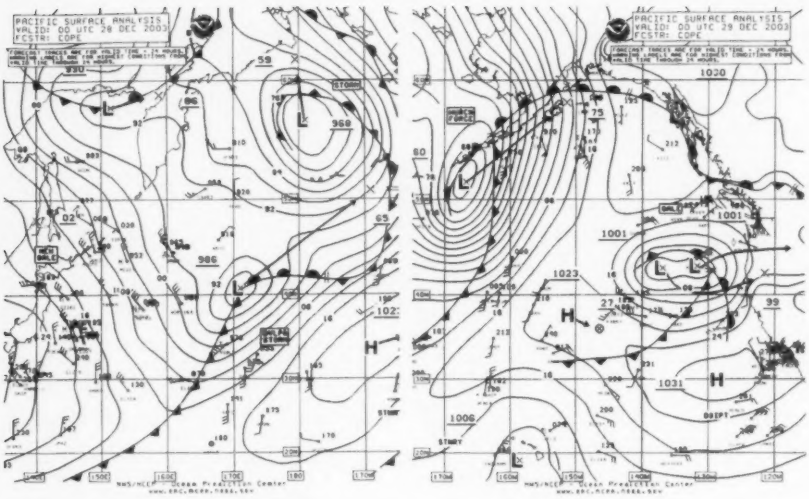

Figure 12. OPC North Pacific Surface Analysis charts (Part 2 – west and Part 1 - east) valid 0000 UTC December 28 and 29, 2003.

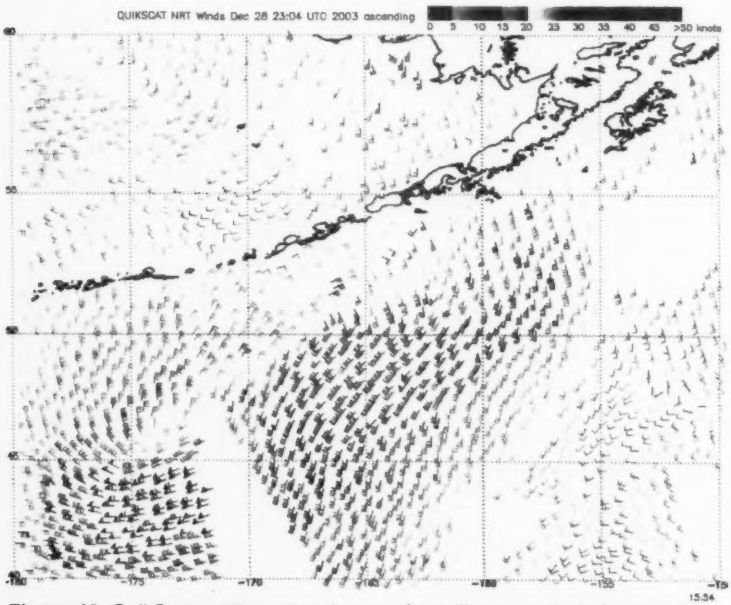

Figure 13. QuikScat scatterometer image of satellite-sensed winds around the storm shown in Figure 12. The valid time of the pass is approximately 1700UTC December 28, 2003, or seven hours prior to valid time of second surface analysis in Figure 12. (From NOAA/DNESDIS/Office of Research and Applications)

North Pacific Storm of 28-30 December 2003. Like other lows of the period, this one moved on a southwest to northeast track from off Japan from December 26 to near the Aleutians late on the 28th (Figure 12) with the low depicted at maximum intensity (960-hPa) in the second part of the figure. Not apparent from available sparse ship data, Figure 13 shows QuikScat winds of up to 70 KT southwest of the center in a pass taken about seven hours prior to the analysis time in the second part of Figure 12. The storm then continued on a northeastward heading into the Gulf of Alaska, where it weakened to a gale-force low off Southeast Alaska by the 31st.

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Marine Weather Review
Tropical Atlantic and Tropical East Pacific Areas
July-December 2003

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Significant Weather of the Period

This article provides a brief review of non-tropical systems (Table 1) which produced significant weather across the tropical regions of the Atlantic and Eastern Pacific during the 2nd half of 2003. Please refer to the articles on the 2003 Atlantic and Eastern North Pacific Hurricane Season for information about tropical systems which affected the area.

I. Atlantic, Caribbean and Gulf of Mexico:

The Gulf of Mexico and western Atlantic were affected by several cold fronts producing gale force winds over the area between late October and the end of 2003. The first of these fronts for the fall season moved into the Gulf of Mexico in late October. Four additional cold fronts produced gale force winds over the western Atlantic and Gulf of Mexico in November. In early November, a low pressure center developed just south of Bermuda. The low moved southwest and produced an area of gales between the east coast of Florida and Bermuda between 1-3 November. In mid December, another strong cold front once again produced gales over the western Atlantic and Gulf of Mexico. In late December, a low pressure center and associated cold front produced an area of gales over the central and eastern Atlantic.

The following is a review of some of these events.

Central Atlantic Low 26-28 October: On the 26 October, a weak low developed along a frontal boundary that extended across the central Atlantic from 31N 48W through 25N 58W to just north of Hispaniola. The low was centered near 28N 48W at 1800 UTC 26 October. At this time a 1034-hPa high was centered north of the low, off the east coast of the United States. The tight pressure gradient between the low and high produced an area of northeasterly gale force winds from 27N to 31N, west of the low to 65W. The ships **Polar Uruguay (ELTH2)** and **Star Drottanger (S6PD)** encountered 35 KT northeast winds just west of the low center at 1800 UTC. The ship observations confirmed a 2152 UTC Quikscat pass that also detected 30 to 35 KT winds just west of the low center. The low moved southwest and was centered near 26N 53W at 1200 UTC 27 October. At this time, the **Star Drottanger** again reported 35 KT winds. Late on the 27th, the low weaken as it drifted westward and the high moved northeastward into the north-central Atlantic. The pressure gradient between the high and low weakened and winds decreased to below gale force early on the 28th.

Gulf of Mexico and Western Atlantic Cold Fronts: The first gale producing cold front of the fall season moved off the coast of Texas early on 26 October. Winds increased to gale force behind the front as strong high pressure began building south on the 27th. A 1221 UTC 27 October Quikscat pass detected 30 to 35 kt winds over the southwest Gulf of Mexico. Buoy 42002 near 25.2N 94.4W reported 36 KT winds with gusts to 43 KT at 1300 UTC. The event was short-lived as winds decreased to below gale force around 0000 UTC 28 October. On 9 November a cold front moved south into the western Atlantic. North of the front a 1041-hPa high was centered over the northeast United States.

Event	Area	Beginning	Ending
1	Central Atlantic Low	1800 UTC 26 October	0600 UTC 28 October
2	Southwest Gulf of Mexico Cold Front	1200 UTC 27 October	0000 UTC 28 October
3	W. Atlantic Low Pres.	0000 UTC 02 November	0600 UTC 03 November
4	W. Atlantic Cold Front	0600 UTC 09 November	1800 UTC 11 November
5	Western Gulf of Mexico Cold Front	1800 UTC 18 November	0000 UTC 20 November
6	Western Gulf of Mexico Cold Front	2100 UTC 23 November	0000 UTC 25 November
7	Western Gulf of Mexico Cold Front	0600 UTC 28 November	0600 UTC 29 November
8	Gulf of Mexico and W. Atlantic Cold Front	1800 UTC 16 December	1200 UTC 18 December
9	Central Atlantic Low and Front	1800 UTC 28 December	0600 UTC 31 December

Table 1. Estimated beginning and ending times of gale events in the tropical Atlantic, Caribbean, and Gulf of Mexico between July and December, 2003.

The tight pressure gradient behind the front produced an area of northeasterly gales north of 29N west of 65W to the southeast coast of the United States. Several Quikscat passes between the 9th and 11th detected 30 to 35 KT northeast winds over the western Atlantic. Buoy 41012 near (30N 80.5W) reported northeast winds of 33 KT with gusts to 41 KT at 1500 UTC 9 November. At 0000 UTC 11 November, the ship **P&O NEDLLOYD PIRAEUS (MZMN7)** observed 35 KT winds near 29N 70W. The high north of the area weakened on the 11th and winds decreased to below gale force.

The next three gale producing cold fronts affected the western Gulf of Mexico. The first of these fronts moved off the Texas Coast around 1800 UTC 18 November. Gale force winds accompanied the front over the western Gulf of Mexico. Buoy 42020, near 27N 96.7W, detected northwesterly winds of 34 KT early on 19 November. The front moved quickly eastward and high pressure settled over south Texas late on the 19th. Winds decreased to below gale force by 0000 UTC 20 November. The second front to produce gales over the western Gulf of Mexico in November moved off the Texas coast around 2100 UTC 23 November. Buoy 42019 reported 33 KT northerly winds with gusts to 42 KT at 0200 UTC 24 November. Buoy 42002 felt 35 KT winds with gusts to 42 KT around 1200 UTC. An 1159 UTC Quikscat pass agreed with the buoy observation by detecting 30 to 40 KT northerly winds over the southwest Gulf of Mexico south of 26N west of 94W. Wave heights at buoy 42002 reached 5.75 meters (19 ft) just after 1200 UTC. Winds decreased late on the 24th and a Quikscat pass from around 0000 UTC 25 November that the gales had ended. The strongest front of the period entered the northwestern Gulf of Mexico around 1800 UTC 27 November. A 1048-hPa high pressure system over the central United States began building southward behind the front early on the 28th. Winds behind the front increased to gale force over the northwestern Gulf of Mexico by 0600 UTC 28 November. An 1155 UTC Quikscat pass detected a large area of 30 to 40 KT northerly winds behind the front, west of 90W. Gale force northerly winds blew across buoy 42002 between 0500 and 1700 UTC on the 28th. The highest wind gust recorded at the buoy was 46 KT around 0600 UTC. Seas reached 6 meters (20 ft) at the buoy at 1800 UTC. The gale force winds were also felt at 1800 UTC by the ships **Celebration (H3GQ)** and **Cleveland (KGXA)**. Both ships encountered 35 KT winds over the northwestern Gulf. This event also produced storm force winds in the Gulf of Tehuantepec (see Eastern Pacific section) and near gale conditions over the eastern Gulf and the northwestern Caribbean Sea. The event ended over the Gulf of Mexico by 0600 UTC 29 November. The final front of the period that produced gale force winds over the Gulf of Mexico and western Atlantic moved off the Texas coast shortly after 0600 UTC 16 December. Gale force winds began over the Gulf of Mexico behind the front around 1800 UTC on the 16th. At this time the ship **HP9685** observed 35 KT winds over the northwestern Gulf. Quikscat data from 0102 UTC 17 December detected northerly gale force winds of 30 to 40 KT behind the front. The front moved into the Atlantic waters just after 1200 UTC 17 December. At this time, winds increased to gale force over the Atlantic north of 28N in vicinity of the front. Winds decreased to below gale force over the Gulf of Mexico by 0000 UTC 18 December and over the Atlantic around 1200 UTC.

Central and East Atlantic Low and Front 28-31 December: A strong upper-level trough moved into the western Atlantic late on the 27 December. The trough aided in the development of a low near 24N 59W early on the 28th. The low developed along a cold front which extended from 31N 56W to Puerto Rico. The low moved northeastward and at 1800 UTC was centered near 27N 56W, with a central pressure of 1001-hPa. At this time the low began producing gale force winds. At 1800 UTC, the ship **Star Fraser (LAVY4)** encountered 35 KT winds about 240 nmi southwest of the center. A 2125 UTC Quikscat pass detected 30 to 40 KT winds around the low. At 0600 UTC 29 December, the low deepened to 996-hPa and was centered near 30N 52W. A 0838 UTC Quikscat data detected 30 to 40 KT winds within about 300 nmi of the center. At 1200 UTC 29 December, the ship **Chiquita Schweiz (C6KD9)** observed 35 KT winds near 29N 48W. By 1800 UTC, the low center moved north of 31N. However, gale force winds continued east of the trailing cold front which extended through 31N 47W - 25N 48W to 13N 60W. At 0600 UTC 30 December, the ship **Pilgram (ELTP9)** reported 35 KT southerly winds just east of the cold front near 31N 42W. At 0600 UTC 31 December, the front became stationary along 31N 42W 23N 45W to 12N 60W. At this time, winds east of the front decreased below gale force. The low also produced large northerly swells, 4.5 to 6 meters (15 to 20 ft), north of 25N to the west of the low and front to 65W.

The swells affected portions of the northern Leeward Islands and Puerto Rico. Figure 1 is a visible satellite image from 1815 UTC 30 December which depicts the Atlantic cold front. The front moved to well south of the Leeward Islands. This system brought unusually dry and cooler air well to the south. The dewpoint in Puerto Rico and the northeastern Leeward Islands fell to around 16 C (60 F) on the 30th.

II. Eastern North Pacific

The Gulf of Tehuantepec gale season began a few weeks later than normal. Typically, the first Tehuantepec gale event occurs in mid-October, but in 2003 the first event of the fall season did not occur until 9 November. However, once the season began, Tehuantepec events occurred frequently during the later half of November and December. A total of eleven gale or greater wind events occurred between 10 November and 31 December. Two of the events produced storm force winds. Table 2 is a list of the estimated beginning and ending times of Gulf of Tehuantepec gale and storm events between July and December 2003. These events were verified by either a reliable ship observation or timely Quikscat data.

Gulf of Tehuantepec Events: The first Gulf of Tehuantepec gale event began shortly after 1800 UTC 9 November. No ship observations of gale force winds were reported during this event. However, the ship **9HQK6** encountered 30 KT winds well south of the Gulf at 0000 UTC 10 November. Quikscat scans missed the area late on the 9th and early on the 10th. But, a pass from 2352 UTC 10 November detected 30 to 35 KT winds over the area.

Table 2. Estimated beginning and ending times for Gulf of Tehuantepec gale and storm events from July through December, 2003. Storm events are denoted with an asterisk (*).

Event	Beginning	Ending
1	1800 UTC 9 November	0600 UTC 11 November
2	0000 UTC 14 November	1200 UTC 15 November
3	1800 UTC 19 November	1800 UTC 21 November
4	1800 UTC 24 November	1800 UTC 25 November
5*	1200 UTC 28 November	0000 UTC 3 December
6	0000 UTC 6 December	0000 UTC 8 December
7	0000 UTC 11 December	1800 UTC 11 December
8	1200 UTC 14 December	0000 UTC 16 December
9*	0000 UTC 17 December	1200 UTC 22 December
10	0600 UTC 24 December	0600 UTC 25 December
11	0000 UTC 30 December	1800 UTC 31 December

Winds decreased to below gale force by 0600 UTC 11 November. The second event began at 0000 UTC 14 November. The ships **A8CB4** and the **Majestic Maersk (OUJH2)** observed 35 KT winds at 1200 and 1800 UTC respectively in the Gulf of Tehuantepec. Quikscat data from 1231 UTC 15 November indicated that the event had ended. The third November event began around 1800 UTC 19 November. This event was stronger that than the two previous gale events. Quikscat data from 1202 UTC 20 November detected a large area of 35 to 45 KT winds in the Gulf of Tehuantepec. Quikscat passes on the 20th and early on the 21st indicated that the winds weakened slightly, but remained at gale force until about 1800 UTC 21 November. There were no ship observations of gale force winds during this event. It appears that ships heeded the warnings and remained away from the area of strongest winds. The next gale event began at approximately 1800 UTC 24 November. A 0030 UTC 25 November Quikscat pass detected 30 to 40 KT winds in the Gulf of Tehuantepec. This event only lasted about 24 hours, ending around 1800 UTC 25 November. The last November event was the strongest of the month. Winds reached storm force. The event began as winds increased to gale force in the Gulf of Tehuantepec around 1200 UTC 28 November. Winds quickly increased to storm force later on the 28th. Quikscat data at 0027 UTC 29 November found a rather large area of 50 to 60 KT winds with an even larger area of 30 to 45 KT winds (Figure 2). High resolution Quikscat data detected winds up to hurricane force (65 KT). The next Quikscat pass at 1130 UTC detected 50 KT winds. It is believed that winds greater than 50 KT were still blowing because the pass did not cover the area of expected strongest winds. At 1800 UTC 29 November and 0000 UTC 30 November the ship **Cielo Di San Francisco (DGZO)** observed northeasterly 40 KT winds near the Gulf of Tehuantepec. A Quikscat pass at 2355 UTC 29 November detected 35 to 45 KT winds. This pass indicated that winds had decreased below storm force. However, gale force winds continued for another few days. Winds finally decreased below gale force around 0000 UTC 3 December. The first December event began around 0000 UTC 6 December. An 1149 UTC Quikscat pass detected 30 to 35 KT winds in the Gulf of Tehuantepec. The next pass at 2355 UTC also found 30 to 35 KT winds over the area.

The ship **APL Tourmaline (9VVP)** confirmed the presence of gale force winds by observing 35 KT winds at 0000 UTC 7 December. The gale ended by 0000 UTC 8 December. The next gale event of the period was short-lived, beginning just before 0000 UTC 11 December and ending at 1800 UTC that day.

A Quikscat pass from around 0000 UTC 11 December detected 30 to 35 KT winds. A ship (name unknown) encountered 35 KT in the Gulf of Tehuantepec at 0600 UTC. The next event began around 1200 UTC 14 December. The gale was verified by the ship **Maersk Windhoek (DHBN)** report of 40 KT winds in the Gulf of Tehuantepec at 1800 UTC. The event lasted about 36 hours, ending at 0000 UTC 16 December. The next Tehuantepec event was the strongest in December. Winds again reached storm force. The event began shortly after 0000 UTC 17 December. Winds quickly increased to storm force based on the ship **Figaro (S6PI)** report of 50 KT winds at 0600 UTC. A 1205 UTC Quikscat pass detected a large area of 45 to 55 KT winds. The ship **Peninsular Bay (MHCQ7)** reported 45 KT winds well south of the Tehuantepec near 13N 96W. The winds decreased below storm force around 0600 UTC 18 December. However, winds remained above gale force for several more days. The ship **London Express (DPLE)** observed 35 KT winds at 0000 UTC 21 December. Several Quikscat passes between 2345 UTC 18 December and 1136 UTC 22 December observed 35 to 40 KT in the Gulf. Quikscat data also detected that 20 to 25 KT winds spread unusually far south during this event. These winds covered most of the eastern North Pacific from 5N to 14N, east of 110W. The event ended shortly after 1200 UTC 22 December. There were no ship observations of gale force winds during this event.

The next event began at 0600 UTC 24 December. There were no ship observations of gale force winds during this event. However, both the 1224 UTC 24 December and 0056 UTC 25 December Quikscat passes detected 30 to 35 KT winds in the area. The event lasted only 24 hours, ending around 0600 UTC 25 December.

The last event of the month began around 0000 UTC 30 December. Again, there were no ship reports of gale force winds during this event. A 0026 UTC Quikscat pass indicated 30 to 35 KT winds in the Gulf of Tehuantepec. This event ended by 1800 UTC 31 December. ⚓

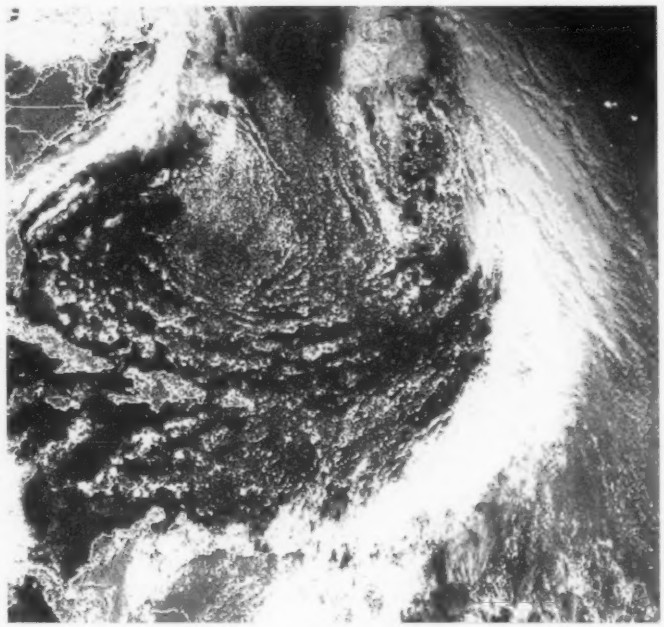

Figure 1. GOES 12 visible image of the Atlantic low and cold front at 1815 UTC 30 December 2003. Note that the cold front moved south of the Leeward Islands.

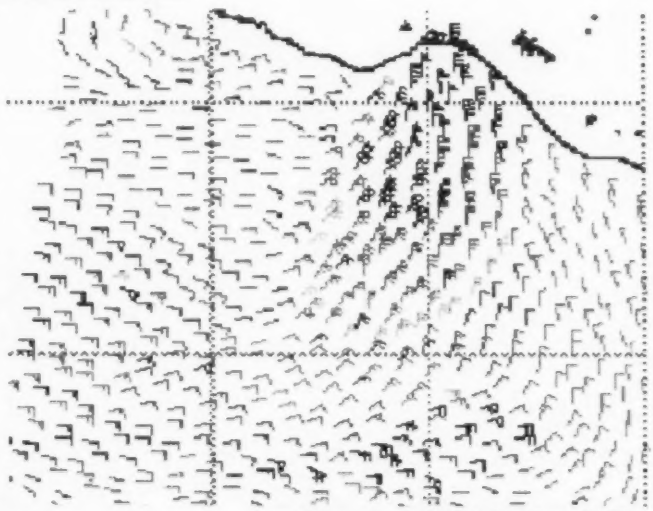

Figure 2. Quikscat data from 0027 UTC 29 November 2003.

Atlantic Hurricane Season of 2003

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1. Introduction

There were 16 named tropical cyclones in the Atlantic basin in 2003 (Table 1, Fig. 1), seven of which became hurricanes and three became major hurricane (category three or higher on the Saffir-Simpson Hurricane Scale or SSHS). This activity was well above the long-term averages of 10 named tropical cyclones, of which six become hurricanes and two become major hurricanes. In addition, there were five tropical depressions that did not reach storm strength. Including 2003, there have been six seasons with 16 or more named tropical cyclones in the 118 seasons since 1886, so the 2003 season ranks in the upper fifth percentile of seasonal number of named tropical cyclones.

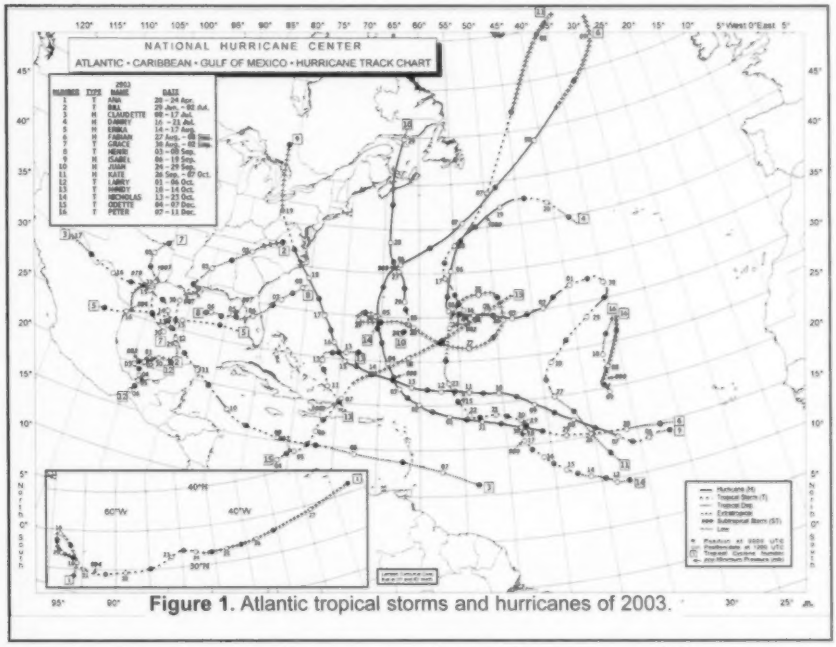


Figure 1. Atlantic tropical storms and hurricanes of 2003.

There were two U.S. hurricane landfalls: Claudette struck Texas near Matagorda Island as a category-one hurricane, while Isabel made landfall on the Outer Banks of North Carolina as a category-two hurricane. Isabel brought hurricane conditions to portions of North Carolina and Virginia and record flood levels from storm surge to the upper Chesapeake Bay. Elsewhere, Fabian was the most destructive hurricane to hit Bermuda in over 75 years and Juan was the worst hurricane to hit Halifax, Nova Scotia in its modern history. Erika just reached hurricane strength as it made landfall in northeastern Mexico.

This season's tropical cyclones took a total of 49 lives, including 25 in the United States. Total damage in the United States is estimated at 3.6 billion dollars, mostly from Hurricane Isabel.

An April tropical storm and two December tropical storms extended the season well beyond the normal June-through-November limits. Ana was the first April tropical storm on record and only one other year, 1887, has produced two December storms.

In the individual summaries below, dates are based on Universal Coordinated Time.

2. Individual storm summaries

Tropical Storm Ana: Ana began as a non-tropical low about 210 nmi south-southwest of Bermuda on 18 April. After making a cyclonic loop, it developed sufficient organized convection to become a subtropical storm on 20 April. It acquired tropical characteristics early on 21 April when its maximum sustained winds were estimated at 50 KT. Ana moved generally toward the east before becoming extratropical on 24 April. Two ships reported tropical-storm force winds during Ana. The **Atlantic Forest** reported 44 KT winds and a pressure of 998.0-hPa at 0900 UTC 22 April. The **Rosa Delmas** reported 41 KT winds at 0300 UTC 23 April. Two deaths are attributed to Ana: a boat capsized at Jupiter Inlet, Florida on 20 April, due to a combination of incoming swells from Ana and the outgoing tide.

Tropical Storm Bill: Bill formed over the southern Gulf of Mexico on 29 June from the interaction of a tropical wave with an upper-level low. It moved northward and intensified, making landfall in southeastern Louisiana with maximum sustained

Table 1. Atlantic tropical storms and hurricanes of 2003.

Name	Class*	Dates**	Max. winds KT	Min pressure hPa)	Direct deaths	U.S. damage ($million)
Ana	T	20-24 Apr	50	994	2	
Bill	T	29 Jun-2 Jul	50	997	4	50
Claudette	H	8-17 Jul	80	979	1	180
Danny	H	16-21 Jul	65	1000		
Erika	H	14-17 Aug	65	986	2	
Fabian	H	27 Aug-8 Sep	125	939	8	
Grace	T	30 Aug-2 Sep	35	1007		
Henri	T	3-8 Sep	50	997		
Isabel	H	6-19 Sep	145	915	17	3,370
Juan	H	24-29 Sep	90	969	2	
Kate	H	25 Sep-7 Oct	110	952		
Larry	T	1-6 Oct	55	993	5	
Mindy	T	10-14 Oct	40	1002		
Nicholas	T	13-23 Oct	60	990		
Odette	T	4-7 Dec	55	993	8	
Peter	T	7-11 Dec	60	990		

* T - tropical storm, maximum sustained winds 34-63 KT;
H - hurricane, maximum sustained winds 64 KT or higher.
** Dates based on UTC time and include tropical depression stage.

winds estimated at 50 KT near 1800 UTC the next day. The cyclone then turned northeastward across the southeastern United States, becoming absorbed by a frontal system over Virginia on 3 July. A few ships encountered Bill, and selected observations are given in Table 2. The highest ship-reported winds were from the **Maersk Rapier**, which reported 45 KT winds at 0000 UTC 30 June. The Louisiana Offshore Oil Port (LOOP) marine terminal reported 56 KT sustained winds with a gust to 65 KT 150 ft above sea level at 1525 UTC 30 June. On the coast, a station at Terrebonne Bay operated by the Louisiana Universities Marine Consortium reported 50 KT sustained winds with a gust to 58 KT, while the Coastal Marine Automated Network (C-MAN) station at Southwest Pass (BURL1), Louisiana, reported 48 KT sustained winds with a gust to 65 KT. On land, Bill produced 30 tornadoes from Louisiana to North Carolina, caused coastal flooding, and dumped heavy rains. One tornado struck Reserve, Louisiana, damaging 20 mobile homes and injuring four persons. Bill was responsible for four deaths and 50 million dollars in damage.

Hurricane Claudette: A strong tropical wave moved through the Windward Islands on 7 July. The system developed into Tropical Storm Claudette the next day over the central Caribbean Sea. The storm moved generally westward through 10 July, then turned northwestward on 11 July while reaching and briefly retaining hurricane strength. Claudette continued northwestward across the Yucatan Peninsula into the southern Gulf of Mexico on 11 July with 50 KT winds, then moved slowly and erratically northwestward for the next two days. The cyclone began turning westward late on 14 July, and it accelerated westward on 15 July as it regained hurricane status. Maximum sustained winds reached an estimated 80 KT (SSHS category one) as Claudette made landfall at Matagorda Island, Texas (just east of Port O'Connor), near 1500 UTC that day (Figure 2). Claudette continued generally westward across southern Texas and northern Mexico, finally dissipating over the high terrain of northwestern Mexico on 17 July. The cyclone was slow to weaken over land. Radar and satellite images indicated that its structure remained distinct for more than 24 hours after landfall, and surface observations indicated that it remained a tropical storm until reaching western Texas. Several ships encountered Claudette with selected observations in Table 3. The highest ship-reported winds were sustained 56 KT from the **Rhapsody of the Seas** at 0600 UTC 14 July. The **Discover Spirit** reported 55 KT sustained winds with a gust to 67 KT at 0000 UTC that day, and the **James N. Sullivan** reported 55 KT sustained winds at 1500 UTC that day. Additionally, several oil rigs in the northwestern Gulf of Mexico reported hurricane-force winds at 100-200 ft above sea level. At the coast, the Remote Automated Weather Stations (RAWS) site on Matagorda Island

reported a 10-min average wind of 65 KT, while the Texas Coastal Ocean Observation Network (TCOON) station at Port O'Connor reported a 6-min average wind of 62 KT with a gust to 78 KT. Claudette produced storm surges of 3-6 ft on the Texas coast between Matagorda Island and Galveston Bay. The hurricane also generated two tornadoes and rainfall of up to 6.5 inches. It was directly responsible for one death and 180 million dollars in damage in Texas. Minor damage was reported from St. Lucia in the Windward Islands from the pre-Claudette tropical wave.

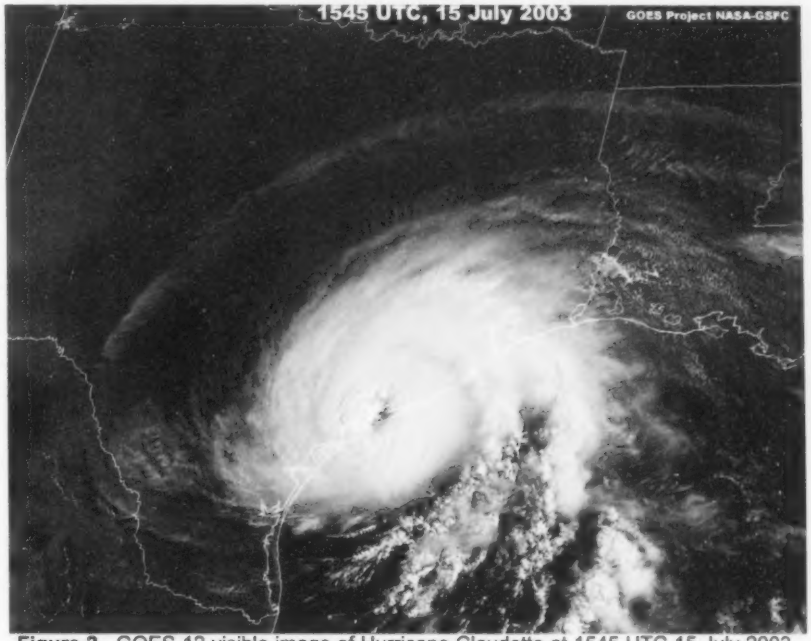


Figure 2. GOES-12 visible image of Hurricane Claudette at 1545 UTC 15 July 2003. Image courtesy of the GOES project at the NASA Goddard Space Flight Center.

Hurricane Danny: Danny developed from a tropical wave about 550 nmi east of Bermuda on 16 July. The cyclone moved northward and then eastward across the North Atlantic Ocean beginning a lengthy clockwise loop. Danny became a hurricane with estimated maximum sustained winds of 65 KT on 18-19 July. It weakened to a tropical storm later on 19 July, to a tropical depression on 20 July, and to a non-convective remnant low on 21 July. The remnant low continued on the clockwise track, with a smaller loop superimposed on the larger-scale track, for six more days. It finally dissipated on 27 July about 1080 nmi east of Bermuda and only 550 nmi east of the point where Danny originated. A ship with the call sign **MANE** reported 39 KT winds at 1200 UTC 20 July.

Hurricane Erika: Erika was first detected as a weak surface low detached from a decaying frontal system about 1000 nmi east of Bermuda on 8 August. This low interacted with an upper-level cold low and the combined system moved across the Bahamas and south Florida. After several attempts to develop in the Atlantic, the system developed into Tropical Storm Erika about 75 nmi west of Ft. Myers, Florida on 14 August. Erika moved quickly slightly south of due west across the Gulf of Mexico and it briefly was a hurricane just before landfall near Boca San Rafael, Mexico around 1030 UTC 16 August (Figure 3). The cyclone moved west-southwestward after landfall and dissipated over northeastern Mexico early the next day. Two ships encountered the northern fringe of Erika. The **Discoverer Deep Seas** reported 40 KT winds at 1200 UTC 15 August, while the **Lykes Discoverer** reported 38 KT winds at 0200 UTC the same day. NOAA buoy 42002 reported 34 KT sustained winds with a gust to 42 KT at 0030 UTC 16 August. On the coast, San Fernando, Mexico, reported 10-min average winds of 35 KT with a gust to 55 KT. Two persons died in Montemorelos, Mexico when their truck was swept away by flood waters as they tried to cross a partially submerged bridge. Portions of northeastern Mexico suffered building roof and automobile damage, as well as the blockage of numerous highways by mud slides.

Hurricane Fabian: Long-lived Fabian followed a clockwise path around the Bermuda-Azores high pressure system. It began as a tropical depression on 27 August from a tropical wave over the far eastern tropical Atlantic Ocean. Fabian moved west-northwestward across the tropical Atlantic from 27 August until 3 September. During that time, it became a tropical storm on 28 August, a hurricane on 30 August, and reached an estimated peak intensity of 125 KT (SSHS category four) on 1 September while about 265 nmi east-northeast of the Leeward Islands. Fluctuating in intensity for several days, but remaining of at least category three intensity, the hurricane turned north-northwestward on 4 September, and hit Bermuda on the

next day with winds near 100 KT (Figure 4). The hurricane turned northeastward on 6 September, and this motion continued until Fabian became extratropical about 700 n mi east-northeast of Cape Race, Newfoundland, on 8 September. Several ships encountered Fabian, mainly as it crossed the north Atlantic shipping lanes (Table 4).

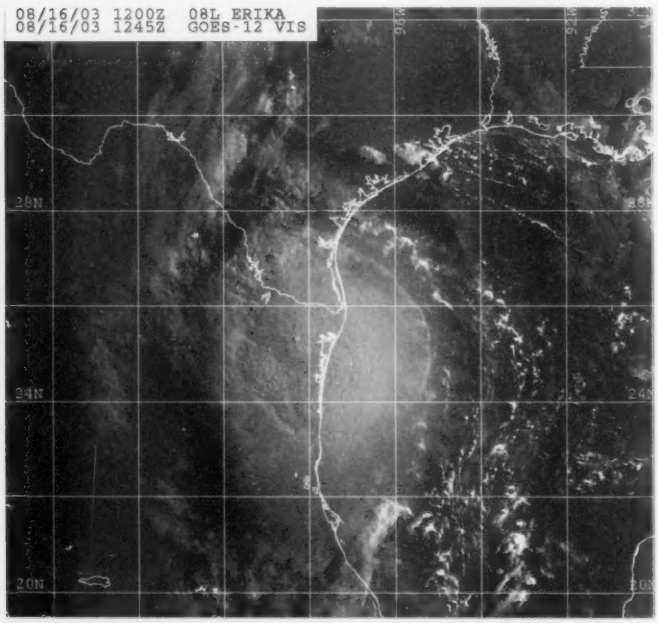


Figure 3. GOES-12 visible image of Hurricane Erika at 1245 UTC 16 August 2003. Image courtesy of the Naval Research Laboratory, Monterey, California.

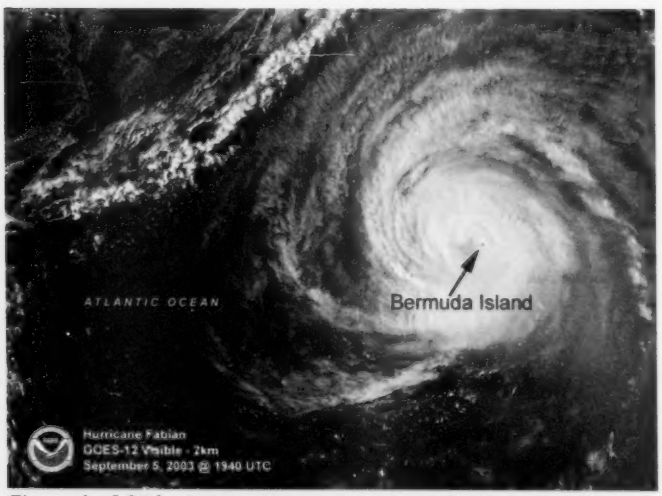


Figure 4. GOES-12 visible image of Hurricane Fabian at 1940 UTC 5 September 2003. Image courtesy of the National Climatic Data Center.

The strongest reported wind was 45 KT at 1200 UTC 7 September from a ship with the call sign **3FKD9**. On hard-hit Bermuda, a station at the Cable and Wireless reported 105 KT sustained winds with a gust to 131 KT, while Bermuda Harbor Radio reported 102 KT sustained winds with a gust of 143 KT. Both observations were 250-300 ft above ground level. Fabian caused four deaths on Bermuda as well as extensive damage estimated near 300 million U.S. dollars. The total death toll of eight includes three fishermen who drowned near Newfoundland and a rip current drowning near Cape Hatteras, North Carolina.

Tropical Storm Grace: The short-lived and disorganized Grace developed from a tropical wave that moved westward from the coast of Africa on 19 August. The wave became a tropical depression and then a minimal tropical storm on 30 August over the west-central Gulf of Mexico. Grace moved northwestward to the Texas coast near Galveston on 31 August as a weakening tropical storm. It weakened to a depression as it moved inland that day, then merged with a frontal system over Arkansas two days later. Two ships encountered Grace. An unidentified ship reported 40 KT sustained winds with a gust to 50 KT at 1500 UTC 30 August, while the **Sealand Challenger** reported 36 KT winds at 0000 UTC 31 August. Several oil rigs reported tropical-storm force winds several hundred ft above sea level. At the coast, the C-MAN station at Sea Rim State Park, Texas, reported 35 KT sustained winds with a gust to 46 KT at 1450 UTC 31 August. Grace caused no casualties and little damage.

Tropical Storm Henri: Henri became a depression from a tropical wave on 3 September over the east-central Gulf of Mexico. It moved erratically eastward through early on 6 September with maximum sustained winds briefly reaching an estimated 50 KT on 5 September. Henri then weakened and accelerated northeastward across north-central Florida as a tropical depression. Henri became extratropical on 8 September off the coast of the Carolinas, with the low moving inland over North Carolina on 12 September.

No ships reported tropical-storm force winds from Henri. However, NOAA buoy 42036 in the Gulf of Mexico reported 10-min average winds of 45 KT with a gust to 64 KT at 1750 UTC 5 September. Henri caused no deaths and little damage.

Hurricane Isabel: Isabel, a classic Cape Verde hurricane, began as a depression over the eastern tropical Atlantic Ocean on 6 September. It moved westward and became a tropical storm later that day, then turned west-northwestward the next day while becoming a hurricane. The cyclone continued west-northwestward until 10 September, and then it turned westward. Maximum sustained winds reached an estimated 145 KT (SSHS category five) on 11 September. Isabel maintained 130-140 KT maximum winds until 15 September (Figure 5). The hurricane resumed a west-northwestward track on 13 September, then turned north-northwestward while weakening on 15 September. This motion continued until Isabel made landfall with maximum sustained winds estimated at 90 KT (SSHS category two) near Drum Inlet, North Carolina around 1700 UTC 18 September. Isabel continued north-northwestward after landfall, with the center crossing northeastern North Carolina into central Virginia by early 19 September as it weakened to a tropical storm. The center continued across northeastern West Virginia, northwestern Maryland, and western Pennsylvania, where Isabel lost tropical characteristics. The extratropical low continued across the Great Lakes into Canada where it was absorbed by a frontal system early on 20 September. Shipping largely avoided the wrath of Isabel, with the most significant reports coming from near the U. S. east coast as Isabel made landfall (Table 5). A ship with the call sign **ZIPR7** reported 52 KT winds at 1200 UTC 17 September. NOAA Buoy 41002 reported 52 KT sustained winds with a gust to 70 KT at 0540 UTC 18 September, along with a 978.8-hPa pressure at 0800 UTC that day. At the coast, an instrumented tower at Cape Hatteras, North Carolina (operated by the University of Florida and Clemson University), reported 69 KT sustained winds with a gust to 85 KT at 1622 UTC 18 September, while a similar tower in Atlantic Beach, North Carolina, measured a 962.8-hPa pressure at 1645 UTC The National Ocean Service station at the Cape Hatteras Pier reported 6-min average winds of 68 KT with a gust to 83 KT before the station was disabled by the storm, likely before the strongest winds arrived. Although Isabel's intensity decreased as it approached landfall, its horizontal size increased.

Figure 5. GOES-12 visible image of Hurricane Isabel at 1815 UTC 12 September 2003. Image courtesy of the Cooperative Institute for Meteorological Satellite Studies of the University of Wisconsin.

Date/Time (UTC)	Ship name or call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed KT	Pressure hPa
29 / 1200	**Celebration**	24.2	88.9	150 / 38	1013.0
29 / 1500	**C6FM7**	25.0	90.0	130 / 40	1014.0
29 / 1800	**C6FM7**	25.4	89.7	140 / 40	1014.0
29 / 2100	**C6FM7**	24.9	89.2	150 / 40	1013.0
30 / 0000	**Maersk Rapier**	25.6	89.5	140 / 45	1012.1
30 / 0000	**Celebration**	27.1	91.9	080 / 35	1011.0
30 / 0900	**Maersk Rapier**	27.0	91.3	250 / 37	1009.5
30 / 1800	**Discoverer Deep Seas**	27.3	90.8	200 / 40	1009.1

Table 2. Selected ship reports with winds of at least 34 KT for Tropical Storm Bill, 29 June-2 July 2003.

The large wind field led to portions of eastern North Carolina and southeastern Virginia experiencing sustained hurricane-force winds. Tropical-storm-force winds spread inland over a large area from eastern North Carolina northward to the eastern Great Lakes and western New England, as well as spreading northward along the Atlantic coast to New York. Storm surge flooding along the Atlantic coast was 6 to 8 feet above normal near the point of landfall and above normal tides extended to Long Island. Over 10 feet of surge was reported on North Carolina's Neuse River. Surge values of 6 to 8 feet were observed in the upper reaches of Chesapeake Bay and in many of the rivers that normally drain into the bay, including the Potomac and James Rivers. Water levels in Washington, D.C., Baltimore, and Annapolis exceeded the previous record levels established by the 1933 Chesapeake-Potomac hurricane. Delaware Bay and the Delaware River also had significant storm surge flooding. Isabel was directly responsible for 17 deaths: ten in Virginia, two in New Jersey, and one each in Maryland, North Carolina, Pennsylvania, Rhode Island, and Florida. The Florida and Rhode Island deaths were drownings in the high surf generated by Isabel. The total damage caused by Isabel is currently estimated at 3.37 billion U.S. dollars.

Date/Time (UTC)	Ship name or call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed KT	Pressure hPa
09 / 0300	**R. Hal Dean**	16.9	72.3	090 / 40	1014.5
09 / 0600	**R. Hal Dean**	16.6	72.0	090 / 36	1012.0
11 / 0356	**Explorer of the Seas**	21.2	86.2	080 / 50	1009.6
11 / 2100	**Saudi Abha**	26.1	87.6	120 / 35	1017.2
13 / 2100	**C6FM7**	25.6	89.6	060 / 41	1014.0
14 / 0000	**Discoverer Spirit**	27.3	91.1	095 / 55G67	N / A
14 / 0600	**Cleveland**	26.6	90.8	090 / 37	1009.0
14 / 0600	**Rhapsody of the Seas**	28.1	92.8	050 / 56	1010.0
14 / 0900	**Rhapsody of the Seas**	27.6	92.0	010 / 53	1006.0
14 / 1100	**Ocean Valiant**	27.3	92.0	180 / 40G53	N / A
14 / 1200	**Sargasso**	27.1	90.8	150 / 44	1010.6
14 / 1200	**Cleveland**	27.9	92.6	090 / 37	1008.0
14 / 1500	**Sargasso**	27.0	90.5	150 / 44	1013.0
14 / 1500	**James N. Sullivan**	27.6	92.8	080 / 55	1003.7
14 / 1800	**Discoverer Deep Seas**	27.2	90.8	140 / 40	1012.8
14 / 1800	**Overseas New Orleans**	28.1	91.2	120 / 38	1012.0
14 / 2100	**James N. Sullivan**	27.5	92.6	150 / 50	999.7
14 / 2100	**Galveston Bay**	28.3	93.1	080 / 54	1005.0
15 / 1200	**Celebration**	26.4	94.0	200 / 35	1008.0

Table 3. Selected ship reports with winds of at least 34 KT for Hurricane Claudette,

Hurricane Juan: Juan had a complex formation, becoming a depression from the interaction of a tropical wave with a large upper-level low about 300 nmi southeast of Bermuda on 24 September. Juan initially had some subtropical characteristics, but became fully tropical while it moved east of Bermuda. It became a hurricane on 26 September, and on 27 September its maximum sustained winds reached an estimated 90 KT while it jogged north-northwestward (Figure 6). Juan moved northward for the rest of its life, and this track brought the center to the coast of Nova Scotia southwest of Halifax near Prospect and Peggy's Cove around 0300 UTC 29 September with estimated winds of 85 KT (SSHS category two). The hurricane continued northward across Prince Edward Island, then weakened to a tropical storm over the Gulf of St. Lawrence. Juan was absorbed by a frontal system over eastern Canada late on 29 September.

Three ships reported tropical-storm force winds from Juan. The **Astron** reported 60 KT winds at 0600 UTC 29 September, while the **Leif Ericson** reported 49 KT winds at 0300 UTC that day. The **Ericson** also reported a 981.1-hPa pressure at 0400 UTC 29 September. Additionally, a ship with the call sign **WCY533** reported 45-KT winds at 0000 UTC 29 September. Canadian buoy 44142 reported 54 KT sustained winds at 2300 UTC 28 September and a 974.7-hPa pressure an hour later. At the coast, McNabb Island, Nova Scotia, reported a 2-min average wind of 81 KT with a gust to 95 KT at 0324 UTC 29 September and a pressure of 982.1-hPa 36 min later. Juan caused extensive damage from the Halifax area northward to Prince Edward Island including to many boats along the coast. The hurricane directly caused two deaths and the Canadian Hurricane Centre reports that Juan is the most damaging storm in modern history for Halifax.

Date/Time (UTC)	Ship call sign or buoy ID	Latitude (°N)	Longitude (°W)	Wind dir/speed KT	Pressure hPa
03 / 1800	**Hornstream**	20.6	59.4	180 / 35	1014.5
05 / 2200	**ELZU6**	34.3	66.1	040 / 43	1003.0
07 / 1200	**EFKD9**	38.4	51.1	180 / 45	1007.3
08 / 0300	**VEP717**	46.7	48.7	010 / 35	993.8
08 / 0300	**3FPK7**	46.7	48.0	320 / 36	990.7
08 / 0300	**HP6038**	46.4	48.4	040 / 40	990.9
08 / 0600	**Contship London**	43.0	40.8	200 / 35	1011.0
08 / 0600	**VEP717**	46.7	48.7	350 / 40	995.2
08 / 0600	**3FPK7**	46.7	48.0	340 / 37	992.7
08/ 0600	**HP6038**	46.4	48.4	310 / 41	993.6

Table 4. Selected ship reports with winds of at least 34 kt for Hurricane Fabian, 27 August-8 September 2003.

Date/Time (UTC)	Ship name or call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed KT	Pressure hPa
17/ 0300	**Duncan Island**	27.4	68.7	160/42	1007.5
17/ 0900	**Duncan Island**	29.1	67.9	160/45	1010.0
17/ 0900	**ZIPR7**	32.0	68.3	110/45	1010.7
17/ 1200	**ZIPR7**	30.2	67.4	150/52	1011.6
17/ 1800	**Sealand Hawaii**	31.0	68.5	130/40	1010.2
17/ 1800	**Galveston Bay**	33.4	76.7	020/37	1010.8
19/ 0000	**Oriental Bay**	35.5	73.1	140/37	1010.6
19/ 0300	**P&O Ned Lloyd Pegasus**	34.7	74.8	190/37	1010.5
19/ 0600	**P&O Ned Lloyd Piraeus**	38.9	72.9	160/45	1015.3
19/ 1200	**James R. Barker**	42.2	81.1	060/42	1001.0

Table 5. Selected ship reports with winds of at least 34 KT for Hurricane Isabel, 6-19 September 2003.

Hurricane Kate: Kate formed into a depression from a tropical wave in the central tropical Atlantic Ocean on 25 September. The cyclone moved northwestward for two days, becoming a tropical storm late on 27 September. It then turned northeastward and continued this motion until 30 September. Kate became a hurricane on 29 September, then interaction with an upper-level low caused weakening to tropical-storm status. This low also helped Kate turn west-southwestward on 1-2 October. Kate regained hurricane status late on 1 October, and continued to strengthen as it moved westward on 3-4 October. Maximum sustained winds reached an estimated 110 KT (SSHS category three) late on 4 October (Figure 7). The hurricane turned northward on 5 October and northeastward the next day. This motion continued until Kate became a powerful extratropical low east of Newfoundland near 0000 UTC 8 October.

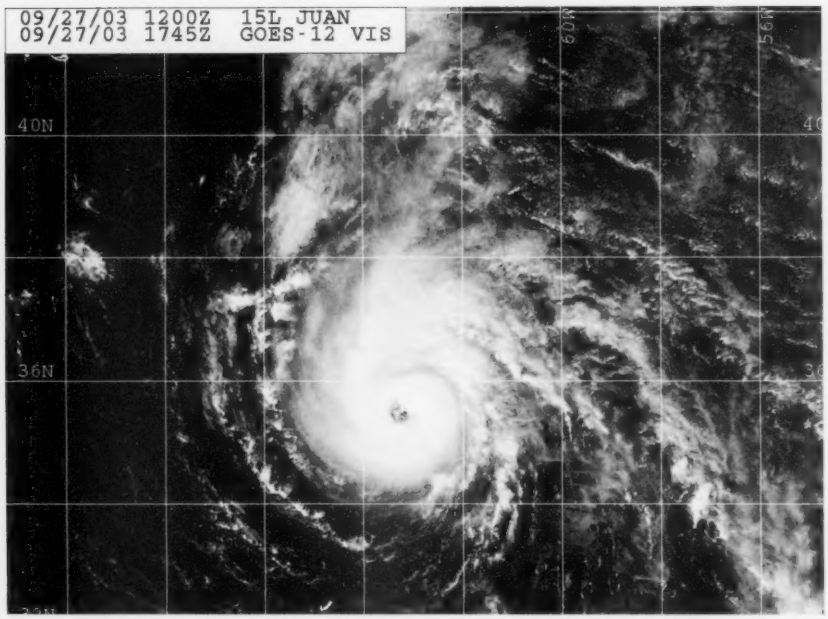


Figure 6. GOES-12 visible image of Hurricane Juan at 1745 UTC 27 September 2003. Image courtesy of the Naval Research Laboratory, Monterey, California.

Date/Time (UTC)	Ship name or call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed KT	Pressure hPa
28 / 1200	**Maracas Bay**	23.0	42.3	180 / 41	1008.2
07 / 0300	**Mackinac Bridge**	37.2	53.3	220 / 39	1007.0
07 / 1200	**Scandinavian Highway**	40.2	50.3	250 / 37	1008.0
07 / 1200	**Leonard J. Cowley**	42.0	46.9	150 / 35	1011.7
07 / 1200	**Alligator Reliance**	43.6	44.0	150 / 35	1015.5
07 / 1200	**Bussol**	44.5	52.8	320 / 39	1001.5
07 / 1200	**Odoyevsk**	43.4	51.7	300 / 33	993.3
07 / 1500	**HP6038**	46.4	48.4	090 / 50	992.1
07 / 1500	**VEP717**	46.7	48.7	120 / 38	993.1
07 / 1800	**Alligator Reliance**	43.4	42.1	150 / 40	1016.0
07 / 1800	**3FPK7**	46.7	48.0	240 / 40	988.9
07 / 2100	**VEP717**	46.7	48.7	320 / 51	1006.0
07 / 2100	**3FPK7**	46.7	48.0	290 / 48	1007.8

Table 6. Selected ship reports with winds of at least 34 KT for Hurricane Kate, 25 September-7 October 2003.

The cyclone merged with another low pressure system near Norway on 10 October. Several ships encountered the fringes of Kate during its lifetime, especially as it moved across the north Atlantic shipping lanes (Table 6). A ship with the call sign **VEP717** reported 51 KT winds at 2100 UTC 7 October, while a ship with the call sign **HP6038** reported 50-KT winds at 1500 UTC that day. Additionally, Canadian buoy 44140 reported 39 KT sustained winds at 1400 UTC that day.

Tropical Storm Larry: Larry developed from a low pressure area spawned by a tropical wave that interacted with a frontal system. The low became an extratropical gale center on 30 September, then developed tropical characteristics and became a tropical storm over the Bay of Campeche on 1 October. Maximum sustained winds reached an estimated 55 KT the next day as the tropical storm drifted slowly and erratically southward moving inland on 5 October with winds estimated at 50 KT near Paraiso, Mexico, in the state of Tabasco. Larry dissipated inland over the state of Vera Cruz the next day. A few ships encountered Larry while it meandered in the Bay of Campeche (Table 7). The strongest reported winds were from a ship with the call sign **ZIYE7**, 50 KT winds at 1800 UTC 2 October. Additionally, several oil rigs in the Bay of Campeche reported tropical-storm force winds at 100-200 feet above the surface.

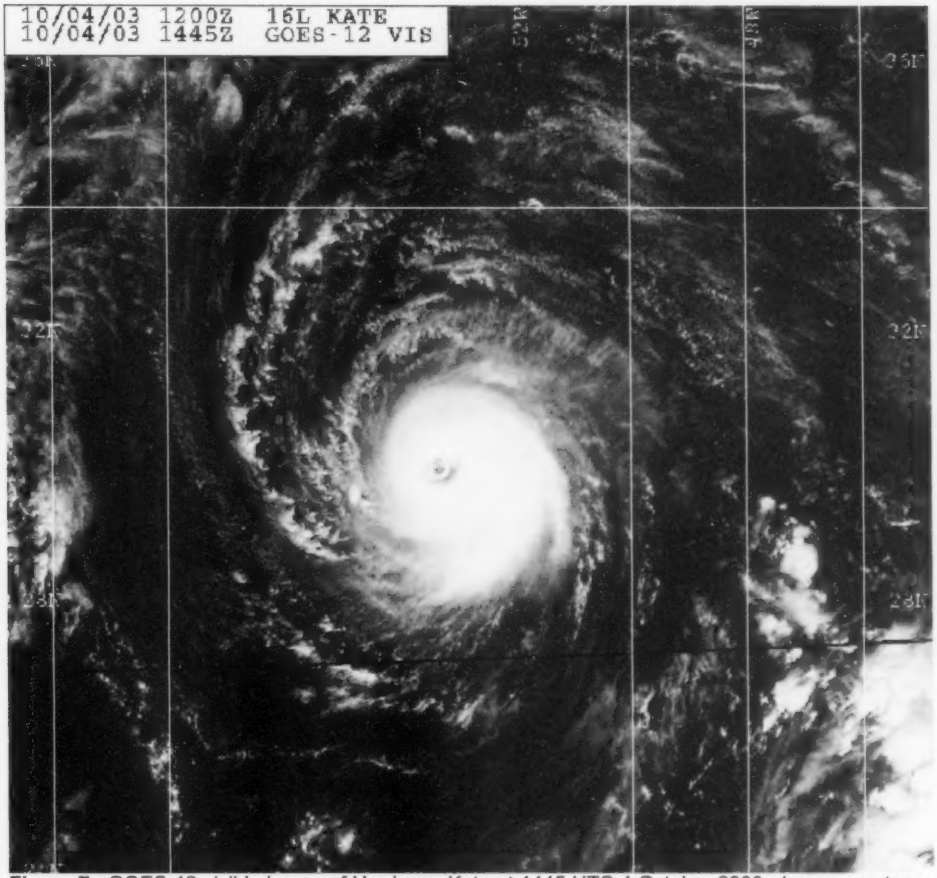


Figure 7. GOES-12 visible image of Hurricane Kate at 1445 UTC 4 October 2003. Image courtesy of the Naval Research Laboratory, Monterey, California.

Heavy rains affected portions of southeastern Mexico and there were five deaths from freshwater floods attributed to Larry.

Tropical Storm Mindy: Mindy originated from a tropical wave and became a tropical storm with 40 KT estimated maximum sustained winds on 10 October near the northeastern tip of the Dominican Republic. Mindy moved northwestward to northward for two days, gradually weakened to a depression by 12 October, and then turned eastward. The depression dissipated on 14 October while located about 400 nmi south-southwest of Bermuda.

Although Mindy passed near the Turks and Caicos Islands on 11 October, heavy rain and tropical storm force winds remained to the east of these islands. Mindy produced periods of heavy rain over portions of Puerto Rico and eastern Dominican Republic.

Tropical Storm Nicholas: Nicholas formed from a tropical wave on 13 October about 790 nmi west-southwest of the Cape Verde Islands. Moving generally northwestward, the system became a tropical storm on 14 October and reached an estimated peak intensity of 60 KT on 17 October. After a slow northward jog from 18-20 October, the storm turned westward on 20-21 October. Nicholas turned north-northwestward on 23 October while weakening to a depression, then it turned northward and degenerated into a non-convective remnant low the next day several hundred nmi southeast of the northern Leeward Islands. The low merged with a cold front later that day and meandered erratically over the western North Atlantic Ocean for several more days.

Tropical Storm Odette: Odette is the first December storm on record to develop over the Caribbean Sea. It developed from an area of disturbed weather that originated along a frontal zone and then lingered over the southwestern Caribbean Sea for several days. The disturbance became a tropical depression, and then a tropical storm, on 4 December about 300 nmi south of Kingston, Jamaica. The storm moved slowly northeastward and maximum sustained winds reached an estimated 55 KT early on 6 December. Later that day, Odette made landfall on the Barahona Peninsula of the Dominican Republic with maximum sustained winds estimated at 50 KT. Odette weakened while moving over Hispaniola, then moved into the Atlantic on 7 December and became extratropical as it merged with a frontal trough. Odette's extratropical remnant circulation raced northeastward and maintained a distinct circulation for two more days before dissipating late on 9 December.

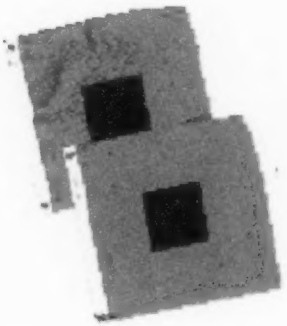
Three ships reported tropical-storm force winds in Odette. A ship with the call sign **MZRS8** reported 38 KT winds at 1200 UTC 6 December, while a ship with the call sign **C6FU9** reported 37 KT winds at 1200 UTC 5 December. The **Mikhail Kutuzov** reported 35 KT winds at 1200 UTC 8 December. Inland, Odette dropped rainfall of up to 9 inches over portions of the Dominican Republic and Haiti. Eight deaths related to freshwater floods or mud slides were reported from the Dominican Republic.

Date/Time (UTC)	Ship name or call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed KT	Pressure hPa
29 / 1800	3FPQ9	25.8	87.7	030 / 35	1013.0
02 / 0300	ELXU6	19.8	94.8	280 / 46	1008.4
02 / 1800	ZIYE7	19.9	96.2	320 / 50	1006.0
02 / 2100	ZIYE7	20.5	96.5	280 / 48	1005.5
03 / 0000	**Endurance**	19.3	94.1	280 / 45	1009.0

Table 7. Selected ship reports with winds of at least 34 kt for Tropical Storm Larry, 1-6 October 2003.

Tropical Storm Peter: Peter formed from a large extratropical gale center over the eastern North Atlantic Ocean. Moving southward, the low gradually acquired organized convection and became Subtropical Storm Peter on 7 December while located about 805 nmi northwest of the Cape Verde Islands. Peter completed its transformation to a tropical storm by 9 December and reached an estimated maximum intensity of 60 KT later that day. At the same time, Peter reversed its southward motion and headed northward ahead of an approaching frontal trough, which was the system that had absorbed Odette a few days earlier. Peter weakened to a depression on 10 December. It became extratropical on 11 December and was absorbed by a cold front soon thereafter. Satellite imagery showed a short-lived eye feature on 9 December, suggesting that Peter may have briefly reached hurricane force.

Tropical Depressions: There were five tropical depressions that did not become tropical storms (Figure 8). Tropical Depression Two formed and dissipated over the tropical Atlantic on 11 June. Tropical Depression Six also occurred over the tropical Atlantic, from 19-21 July. Tropical Depression Seven formed just east of the northeast coast of Florida on 29 July and moved inland over Georgia the next day. Tropical Depression Nine occurred over the eastern Caribbean Sea from 21-22 August. Finally, Tropical Depression Fourteen was present near the Cape Verde Islands from 8-10 September.



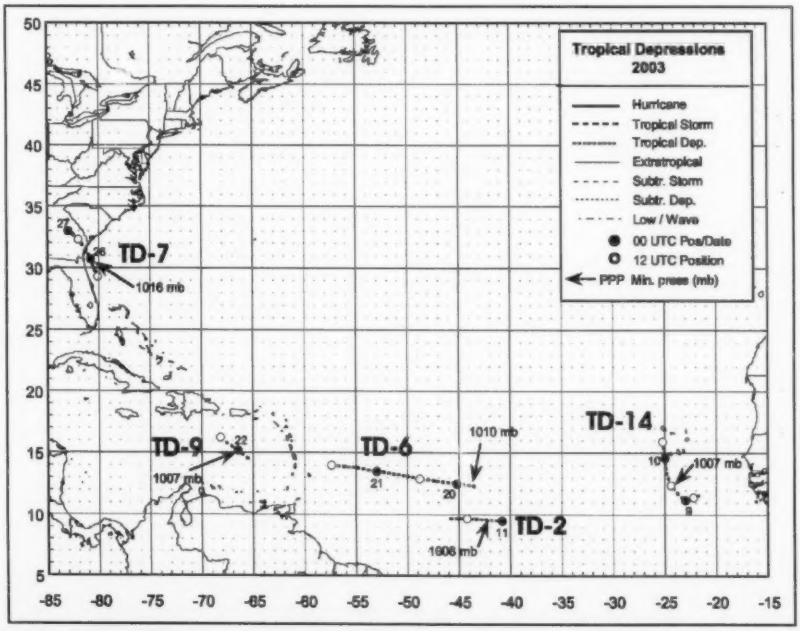


Figure 8. Atlantic tropical depressions of 2003.

Eastern North Pacific Hurricane Season of 2003

John. L. Beven II
National Hurricane Center, Miami, Florida

1. Introduction

There were sixteen named tropical cyclones in the Eastern North Pacific basin in 2003, seven of which became hurricanes (Table 1, Figures 1A & 1B on page 44). These totals are similar to long-term averages of sixteen named tropical cyclones and nine hurricanes. There were no major hurricanes (category three or higher on the Saffir-Simpson Hurricane Scale) during the 2003 season. This is well below the long-term average of four major hurricanes and is the first time this has occurred since 1977. The first hurricane, Ignacio, did not form until 24 August. This is the latest observed first hurricane of record in the basin since reliable satellite observations began in 1966. There were also no depressions that did not become named cyclones. Five named tropical cyclones made landfall in Mexico. Hurricanes Ignacio and Marty came ashore in Baja California bringing high winds, storm surge, and heavy rain. Carlos and Olaf made landfall along the coast of mainland Mexico as tropical storms, while Nora and Marty made landfall in mainland Mexico as tropical depressions.

In the individual summaries below, dates are based on Universal Coordinated Time (UTC).

Table 1. Eastern North Pacific tropical storms and hurricanes of 2003.

Name	Class*	Dates**	Max. Winds KT	Min. Pressure hPa	Deaths
Andres	T	19-25 May	50	997	
Blanca	T	17-22 June	50	997	
Carlos	T	26-27 June	55	996	
Dolores	T	6-8 July	35	1005	
Enrique	T	10-13 July	55	993	
Felicia	T	17-23 July	45	1000	
Guillermo	T	7-12 August	50	997	
Hilda	T	9-13 August	35	1004	
Ignacio	H	22-27 August	90	970	2
Jimena	H	28 Aug - 5 Sep	90	970	
Kevin	T	3-6 September	35	1000	
Linda	H	13-17 September	65	987	
Marty	H	18-24 September	85	970	12
Nora	H	1-9 October	90	969	
Olaf	H	3-8 October	65	987	
Patricia	H	20-26 October	70	984	

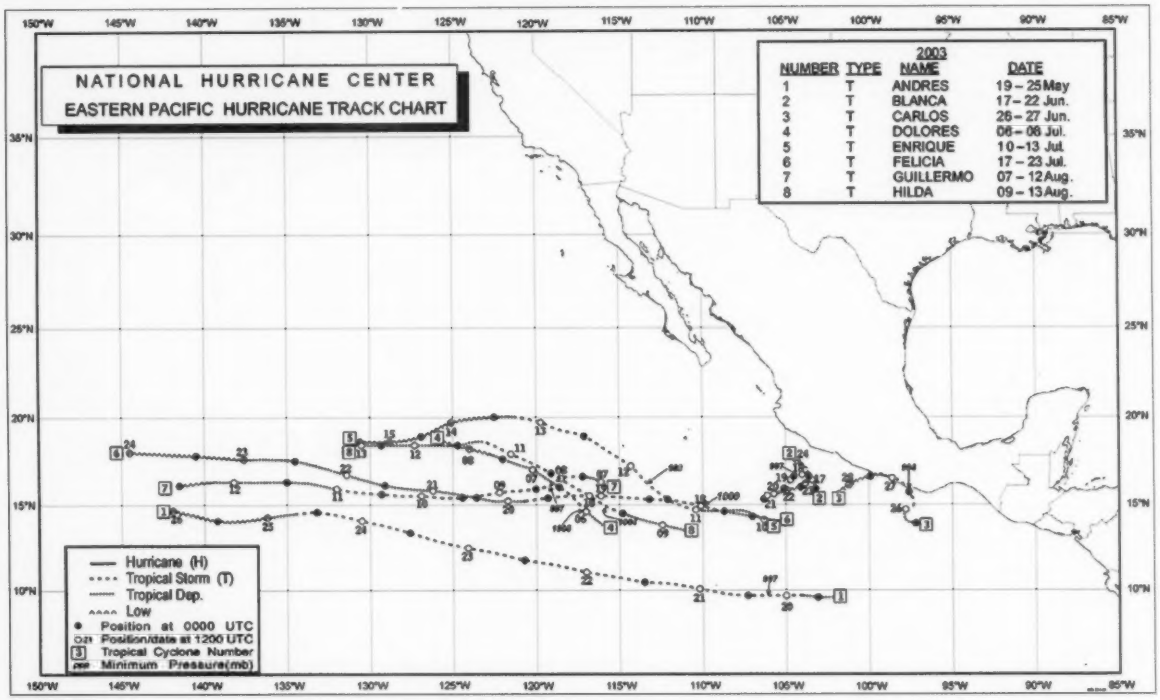
* T - tropical storm, maximum sustained winds 34-63 KT;
H - hurricane, maximum sustained winds 64 KT or higher.
** Dates based on UTC time and include tropical depression stage.

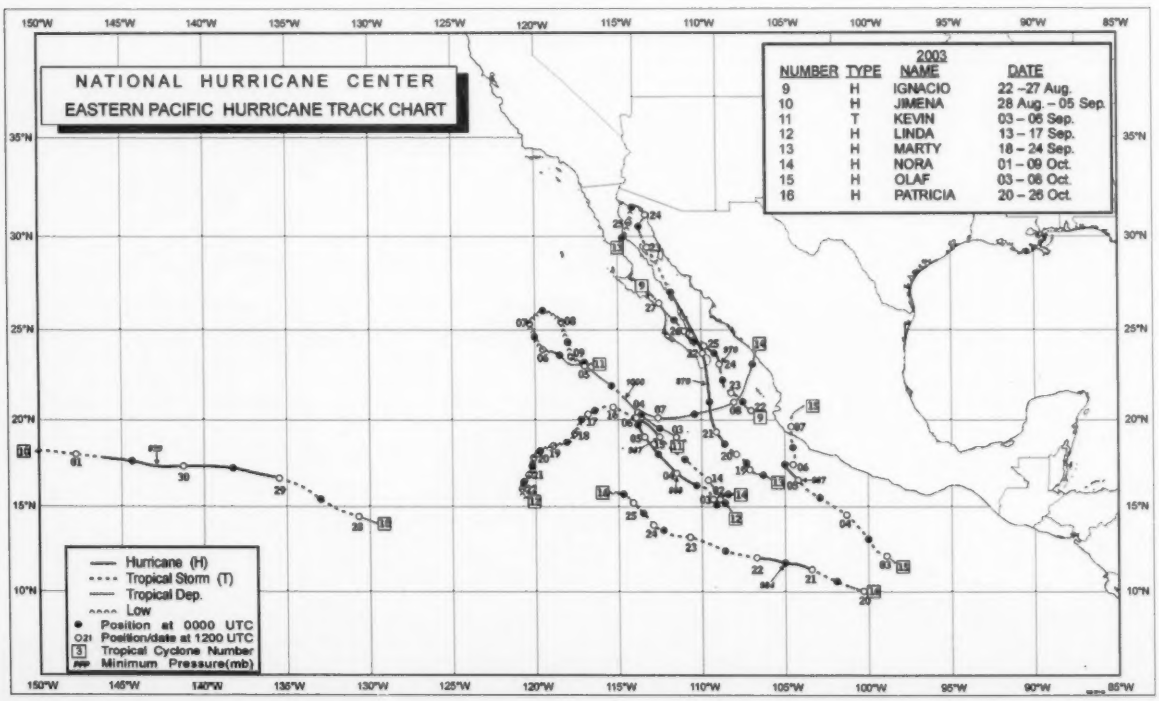
2. Individual storm summaries

Tropical Storm Andres: Andres developed from an area of disturbed weather that formed on 15 May within a broad area of low pressure south of Guatemala. The disturbance moved westward for the next few days and organized into a tropical depression on 19 May about 920 nmi south-southeast of Cabo San Lucas, Mexico. The depression strengthened into the first tropical storm of the season early on 20 May, and maximum sustained winds reached an estimated 50 KT later that day. Andres moved west-northwestward until it began to weaken over cooler water on 24 May, at which time it turned westward. Andres weakened to a depression on 25 May and then degenerated to a non-convective remnant low later that day about 1500 nmi west-southwest of Cabo San Lucas.

Tropical Storm Blanca: Blanca formed about 210 nmi south-southeast of Manzanillo, Mexico, on 17 June and reached an estimated peak intensity of 50 KT the next day. It spent its lifetime meandering near its point of origin. (continued page 45)

Figures 1A & 1B. Eastern North Pacific tropical storms and hurricanes of 2003.


NATIONAL HURRICANE CENTER
EASTERN PACIFIC HURRICANE TRACK CHART
2003
NUMBER TYPE NAME DATE
1 T ANDRES 19 – 25 May
2 T BLANCA 17 – 22 Jun.
3 T CARLOS 26 – 27 Jun.
4 T DOLORES 06 – 06 Jul.
5 T ENRIQUE 10 – 13 Jul.
6 T FELICIA 17 – 23 Jul.
7 T GUILLERMO 07 – 12 Aug.
8 T HILDA 09 – 13 Aug.
Hurricane (H)
Tropical Storm (T)
Tropical Dep.
Low
Position at 0000 UTC
Position/date at 1200 UTC
Tropical Cyclone Number
Minimum Pressure(mb)


NATIONAL HURRICANE CENTER
EASTERN PACIFIC HURRICANE TRACK CHART
2003
NUMBER TYPE NAME DATE
9 H IGNACIO 22 –27 Aug.
10 H JIMENA 28 Aug. – 05 Sep.
11 T KEVIN 03 – 06 Sep.
12 H LINDA 13 – 17 Sep.
13 H MARTY 18 – 24 Sep.
14 H NORA 01 – 09 Oct.
15 H OLAF 03 – 08 Oct.
16 H PATRICIA 20 – 26 Oct.
Hurricane (H)
Tropical Storm (T)
Tropical Dep.
Low
Position at 0000 UTC
Position/date at 1200 UTC
Tropical Cyclone Number
Minimum Pressure(mb)

(continued from page 43).
Southeasterly vertical wind shear caused it to weaken to a depression on 20 June and to a remnant low on 22 June. The low eventually dissipated about 100 nmi south of Manzanillo on 24 June.

Tropical Storm Carlos: Carlos formed from a tropical wave that moved westward from the coast of Africa on 14 June. Disturbed weather developed south of the Gulf of Tehuantepec on 23 June, and a tropical depression formed on 26 June about 120 nmi south of Puerto Escondido, Mexico. The cyclone moved slowly northward and became Tropical Storm Carlos later that day. Carlos made landfall 50 nmi west of Puerto Escondido early on 27 June with estimated maximum sustained winds of 55 KT. The storm rapidly weakened to a remnant low over the mountainous terrain of Mexico later that day. The low drifted back into the Pacific on 28 June, where it dissipated the next day.
Three ships reported tropical-storm force winds during Carlos. The **Sealand Champion** reported 40 KT winds at 1800 UTC 26 June, while the **Raicho II** reported 37 KT winds and a 1001.0-hPa pressure three hours later. A ship with the call sign **NEPP** reported 35 KT winds at 0000 UTC 27 June. No observations of tropical-storm force winds were available from the coast. Press reports indicate that Carlos caused minor damage in the Mexican state of Oaxaca.

Tropical Storm Dolores: Dolores was a short-lived tropical storm forming from a tropical wave that entered the Pacific on 30 June. The system became a depression about 655 nmi south-southwest of Cabo San Lucas early on 6 July and moved generally west-northwestward to northwestward through its life. The system became a minimal tropical storm later that day. Dolores weakened back to a depression early the next day under the influence of strong northeasterly vertical wind shear. The cyclone degenerated into a remnant low early on 8 July. The low dissipated on 9 July about 915 nmi west-southwest of Cabo San Lucas.

Tropical Storm Enrique: Enrique formed from a tropical wave that left Africa on 25 June and reached the Pacific on 6 July. The wave spawned a depression on 10 July about 565 nmi south-southeast of Cabo San Lucas. The cyclone becoming a tropical storm the next day. Enrique moved west-northwestward for the next two days and reached an estimated peak intensity of 55 KT early on 12 July. Later that day, Enrique began to steadily weaken over cooler water and became a tropical depression late on 13 July. The cyclone turned westward and degenerated into a remnant low pressure system on 14 July. It dissipated early on 16 July about 1200 nmi west-southwest of Cabo San Lucas.

Tropical Storm Felicia: Felicia formed from a tropical wave that left Africa on 4 July and reached the Pacific on 12 July. A tropical depression developed late on 17 July about 315 nmi south of Manzanillo. The cyclone became a tropical storm shortly thereafter and reached an estimated peak intensity of 45 KT later that same day. Felicia moved westward for the next seven days while vertical wind shear caused a gradual decay. It weakened to a tropical depression on 20 July and became a remnant low on 23 July. The low crossed 140W longitude into the central Pacific hurricane basin later that day and dissipated on 24 July about 600 nmi east of the Hawaiian Islands.

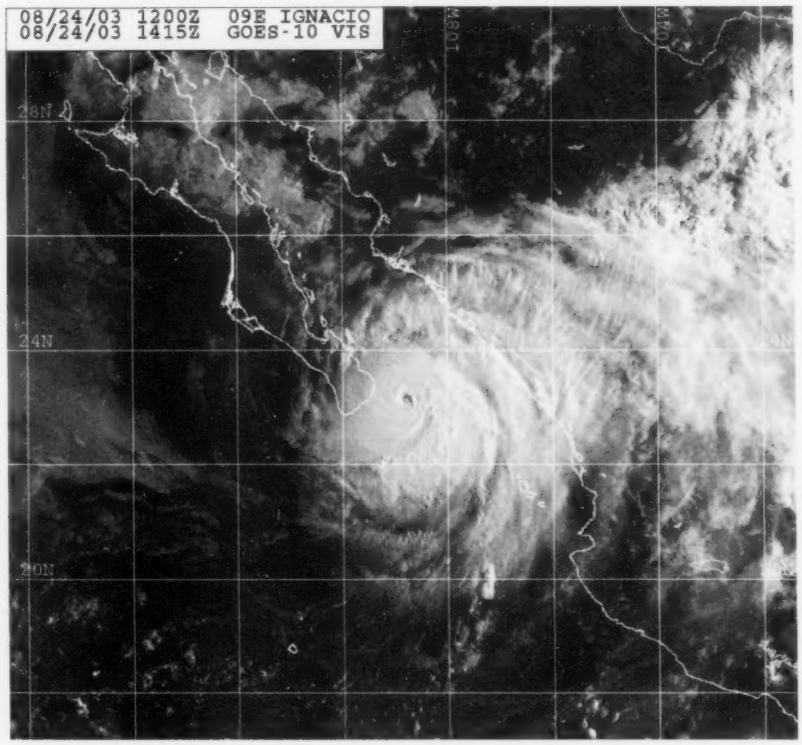
Tropical Storm Guillermo: Guillermo developed from a tropical wave that crossed Central America and moved into the Pacific on 1 August. A weak surface low developed on 6 August and became a depression the next day about 525 nmi southwest of Cabo San Lucas. The depression moved westward and strengthened into a tropical storm early on 8 August. Guillermo reached its estimated peak intensity of 50 KT later that day. Outflow from Tropical Storm Hilda caused Guillermo to weaken on 10 August, and it became a depression the next day. The cyclone degenerated to a remnant low on 12 August about 1750 nmi west of Cabo San Lucas, and the low crossed into the central Pacific hurricane basin before dissipating the next day.

Tropical Storm Hilda: Hilda formed from a tropical wave that moved westward from the coast of Africa on 27 July. The wave spawned a tropical depression about 600 nmi south of Cabo San Lucas on 9 August. It moved toward the west and west-northwest and became a tropical storm with estimated 35 KT winds later that day. That was the peak intensity, and Hilda began to weaken gradually on 11 August. A combination of cooler water and vertical wind shear caused it to dissipate on 13 August about 1200 nmi west-southwest of Cabo San Lucas.

Hurricane Ignacio: Ignacio, the first hurricane of the 2003 season, was the latest-forming first hurricane of record in the eastern North Pacific basin.

It formed from a tropical wave that reached the Pacific on 16 August. A depression developed on 22 August about 190 nmi southeast of Cabo San Lucas. It moved north-northwestward, a motion that would continue for most of its existence, and became a tropical storm the next day. Ignacio strengthened further and became a hurricane on 24 August. Maximum sustained winds reached an estimated 90 KT on 24 August as Ignacio brushed the east coast of extreme southern Baja California (Figure 2). The hurricane made landfall just east of La Paz, Mexico, with estimated sustained winds of 70 KT the next day. Thereafter it weakened while moving over southern Baja California and dissipated late on 27 August over central Baja California. There were no reliable ship or land station reports of tropical-storm force winds from Ignacio. However, press reports indicate the cyclone brought hurricane conditions to the east coast of southern Baja California and widespread heavy rains to the southern and central portions of the Baja peninsula. Ignacio was responsible for two fresh-water drowning deaths in Baja California. Roads, trees, and power lines were damaged, while thousands were evacuated from coastal communities.

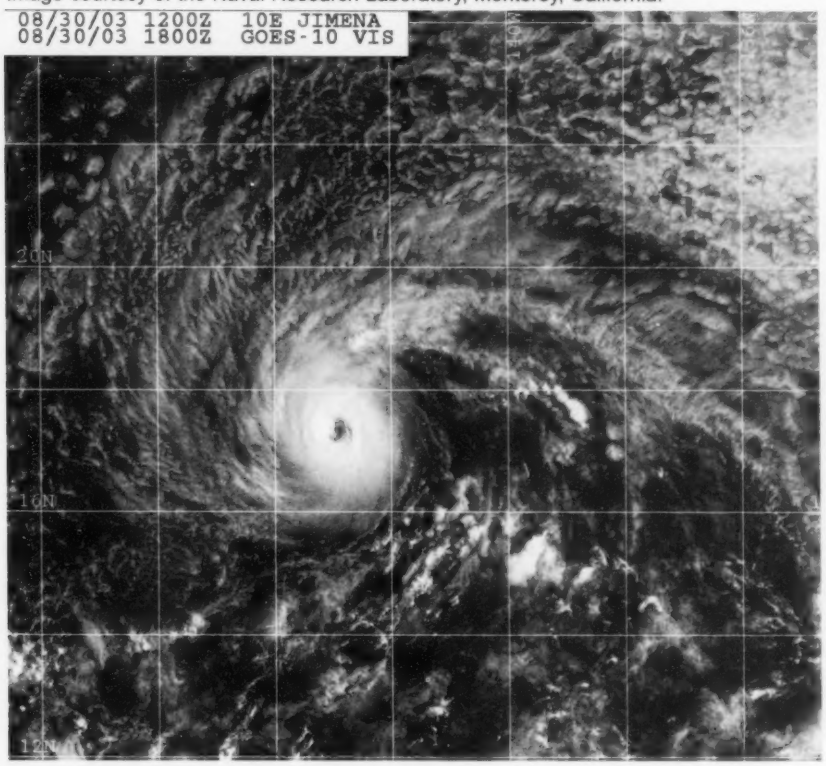
Figure 2. GOES-10 visible image of Hurricane Ignacio at 1415 UTC 24 August 2003. Image courtesy of the Naval Research Laboratory, Monterey, California.



Hurricane Jimena: Jimena formed from a tropical wave on 28 August about 1500 nmi east-southeast of the Hawaiian Islands. Moving west-northwestward, the system became a tropical storm later that day and reached hurricane strength the following day. After turning westward and entering the central Pacific hurricane basin, Jimena strengthened to its estimated peak intensity of 90 KT (Figure 3). By 31 August, increasing vertical wind shear caused Jimena to weaken. The cyclone then moved west-southwestward and, after weakening to a tropical storm, passed about 100 nmi south of the southern tip of the island of Hawaii on 1 September. Jimena became a tropical depression the next day. The cyclone moved westward to west-southwestward for a few days and dissipated on 5 September just after crossing the International Date Line about 1500 nmi west-southwest of the Hawaiian Islands. Jimena brought tropical-storm force gusts to portions of the Hawaiian Islands. The island of Kahoolawe reported a gust of 50 KT, while South Point on the island of Hawaii reported a gust of 46 KT. Rainfall of 6 to 10 inches and high surf were reported on the island of Hawaii in association with Jimena. No casualties or significant damage were reported.

Tropical Storm Kevin: Kevin was a short-lived tropical cyclone that formed from a tropical wave that reached the Pacific on 28 August. The cyclone started as a broad depression early on 3 September about 245 nmi south-southwest of Cabo San Lucas. The cyclone moved northwestward parallel to the Baja California peninsula with maximum sustained winds reaching an estimated 35 KT late on 4 September. Close proximity to cold water caused Kevin to quickly weaken and it became a depression early on 5 September. It then degenerated into a remnant low early the next day about 500 nmi west of Cabo San Lucas. The remnant circulation moved slowly westward for several days before it finally dissipated on 10 September about 365 nmi west of Cabo San Lucas.

Figure 3. GOES-10 visible image of Hurricane Jimena at 1800 UTC 30 August 2003. Image courtesy of the Naval Research Laboratory, Monterey, California.



Hurricane Linda: Linda formed from a tropical wave that crossed into the Pacific on 6 September. The wave spawned a tropical depression late on 13 September about 340 nmi southwest of Manzanillo. The cyclone moved northwestward for the next two days. It became a tropical storm later on 14 September and a hurricane with estimated 65 KT sustained winds the next day. Linda turned westward and weakened to a tropical storm on 16 September, then it turned southwestward and weakened to a depression on 17 September. The cyclone weakened to a remnant low later that day about 445 nmi west-southwest of Cabo San Lucas.

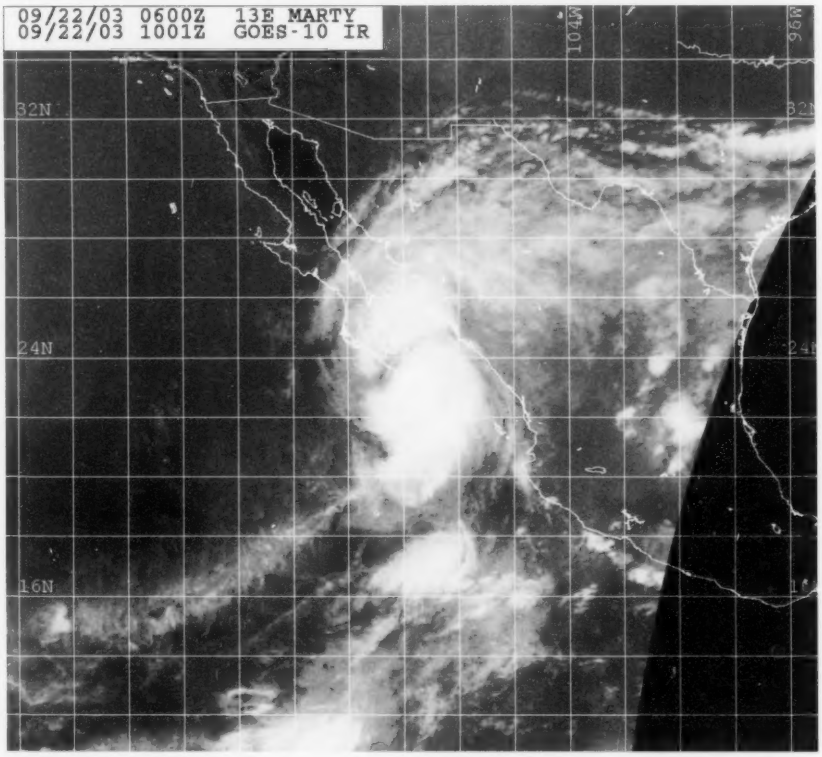
Hurricane Marty: Marty, which was the second hurricane to make landfall in Baja California during 2003, formed from a tropical wave that reached the Pacific on 10 September. The wave spawned a tropical depression on 18 September about 450 nmi south-southeast of Cabo San Lucas. The depression quickly strengthened into a tropical storm as it moved slowly to the west-northwest. Marty turned northwestward and became a hurricane on 21 September. Marty then moved northward toward the southern Baja California peninsula, making landfall just east of Cabo San Lucas on 22 September with maximum sustained winds estimated at 85 KT (Figure 4). Marty then moved north-northwestward along the east coast of the Baja California peninsula, weakening to a tropical storm near Santa Rosalia on 23 September and to a tropical depression later that same day. The cyclone then meandered in and around the northern Gulf of California with heavy rains but weak winds. It made one landfall as a tropical depression on 24 September near Puerto Peñasco on the Mexican mainland and another one as a remnant low the next day south of San Felipe on the Baja California peninsula. The circulation dissipated shortly after the latter landfall.

Two ships encountered Marty on 19 September. The **Zim Iberia** reported 35 KT winds at 0600 UTC 19 September, and this was an important observation in upgrading Marty to a tropical storm. The **Leverkusen Express** reported 35 KT winds at 2100 UTC that same day. Additionally, the **S. V. Sea Witch**, anchored in La Paz harbor, reported a pressure of 971.9-hPa on 22 September as the center of Marty passed over. The storm brought hurricane conditions to the southern Baja California peninsula, with tropical storm conditions occurring along the east coast of central Baja California. An automated station in Cabo San Lucas reported 10-min average winds of 76 KT with a gust to 102 KT at 0900 UTC 22 September. The hurricane was responsible for 12 deaths, including two individuals listed as missing but presumed dead. Five of the deaths resulted from the sinking of a fishing boat in the Gulf of California, while five others were caused by freshwater flooding. Media reports indicate damage to about 4,000 homes in southern Baja California. The cyclone also brought locally heavy rains to much of the remainder of Baja California, portions of northwestern Mexico, and portions of the southwestern United States.

Hurricane Nora: Nora formed from a tropical wave that entered the Pacific on 25 September. A tropical depression developed from the wave on 1 October about 525 nmi south of Cabo San Lucas and moved very slowly toward the west and west-northwest with gradual intensification for the next few days. It became a tropical storm on 2 October and a hurricane early on 4 October. Nora reached its estimated peak intensity of 90 KT later that day. It then weakened to a tropical storm on 6 October and to a depression on 7 October while it turned to the east and then northeast. The cyclone reached the coast of Mexico just north of Mazatlan on 9 October and soon dissipated over high terrain. Nora caused locally heavy rains in the Mexican state of Sinaloa, but there were no reports of damages or casualties.

Hurricane Olaf: Olaf formed from a tropical wave and became a tropical depression on 3 October about 325 nmi south-southeast of Acapulco, Mexico. It strengthened into a tropical storm later that day while moving slowly northwestward. This motion continued for two days while Olaf gradually strengthened to a hurricane with estimated 65 KT sustained winds on 5 October. Olaf was a hurricane for only a few hours before weakening to a tropical storm. The storm turned northward on 6 October and made landfall early the next day near Manzanillo with maximum sustained winds estimated at 50 KT. Olaf then dissipated over the high terrain of the Mexican state of Nayarit on 8 October. A ship with the call sign **ABCA2** reported 47 KT winds at 1800 UTC 3 October. On land, the cyclone caused heavy rains in the Mexican states of Jalisco and Guanajuato, with more than 12,000 homes damaged in Jalisco.

Figure 4. GOES-10 infrared image of Hurricane Marty at 1001 UTC 22 September 2003. Image courtesy of the Naval Research Laboratory, Monterey, California.



Hurricane Patricia: A tropical wave that entered the Pacific on 18 October spawned Patricia. The cyclone began as a tropical depression about 400 nmi south of Acapulco on 20 October. It quickly intensified into a tropical storm later that day. Patricia moved west-northwestward to northwestward and strengthened into a hurricane on 21 October. Maximum sustained winds reached an estimated 70 KT early on 22 October. Westerly vertical wind shear caused Patricia to weaken to a tropical storm later that day and, aside from slight re-strengthening on 24 October, slowly weakened over the next several days. Patricia degenerated into a depression on 25 October and a remnant low on 26 October. The system dissipated later on 26 October about 520 n mi southwest of Cabo San Lucas. ⚓

BURL1, a Coastal-Marine Automated Network Station at Southwest Pass, Louisiana

Overview of the 2003 Central North Pacific Tropical Cyclone Season

Andy Nash, Science & Operations Officer, Hans Rosendal, Tim Craig and Robert Farrell, Hurricane Forecasters
Central Pacific Hurricane Center, Honolulu Hawaii

Total tropical activity for the season was below normal, with two named systems occurring within the area of responsibility of the Central Pacific Hurricane Center (CPHC). One tropical cyclone (01-C) developed within the central Pacific, with one system (Jimena) moving into the area from the eastern Pacific. A third tropical system, Guillermo, weakened to a remnant low just to the east of CPHC's area of responsibility, and although CPHC issued one advisory on the system it will not be considered in the final count of tropical activity for the central Pacific for the season. The season was generally quiet, but Hurricane Jimena still managed to take the spotlight. Jimena, at one point a category two hurricane, was the first direct threat to Hawaii in several years. Although it ended up passing about 100 nmi south of the Big Island as a rapidly weakening tropical storm, it had the potential of coming closer as a hurricane.

Name	Dates	Minimum Pressure hPa	Maximum Sustained Winds KT
Remnants of Tropical Depression Guillermo	Aug 12-13	n/a	25
Tropical Depression 01-C	Aug 15-17	1009	30
Hurricane Jimena	Aug 30-Sep 5**	970	90

Table 1. List of Tropical Cyclones . ** denotes information for only that portion of the storm's lifetime in the central north Pacific (CPHC's area of responsibility).

Remnants of Tropical Storm Guillermo 12-13 August 2003

History. Remnants of an eastern Pacific Tropical Storm, Guillermo, moved west into the central Pacific across 140W between 1800 UTC 12 August and 0000 UTC 13 August. Real-time operational evaluation of the system classified it as a weak Tropical Depression, so the Central Pacific Hurricane Center (CPHC) issued a forecast advisory on Guillermo before downgrading it further. Post storm analysis indicated that the system had in fact weakened sufficiently 6 to 12 hours earlier to be classified as a remnant low at 139.8W, east of the CPHC area of responsibility. The remnant low cloud swirl remained intact for a few more days as it drifted southwest and interacted with another weak low level circulation that ultimately developed into Tropical Depression 01-C.

Figure 1. Visible satellite image of Guillermo taken at 0030 UTC 13 August. Dots on the image are the initial and forecast positions from the forecast bulletin. Plotted values are the maximum forecast winds (above dot) and position valid date/time (below dot) in MDDHH format

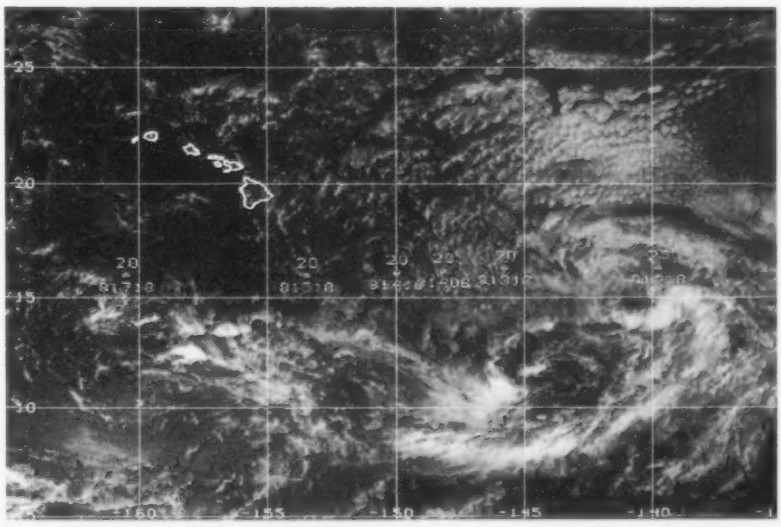


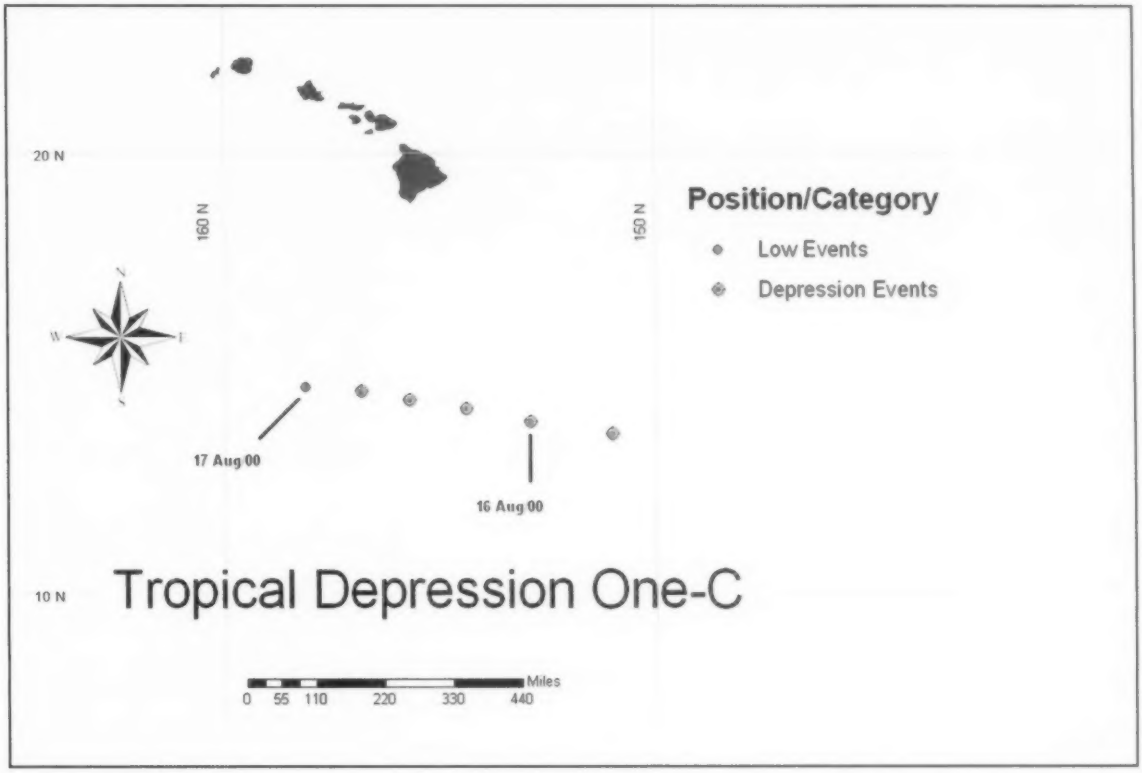
Table 2. TD-01C Best Track Data

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure hPa	Wind Speed KT	Stage/Notes
15 / 1800	13.6	151.0	1009	30	tropical depression
16 / 0000	13.9	152.9	1009	30	"
16 / 0600	14.2	154.4	1009	30	"
16 / 1200	14.4	155.7	1009	30	"
16 / 1800	14.6	156.8	1009	25	"
17 / 0000	14.7	158.1	1009	25	remnant low

Table 3. Jimena Best Track Data (Central Pacific only)

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure hPa	Wind Speed KT	Stage/Notes
30 / 1200	17.3	141.3	972	85	hurricane
30 / 1800	17.3	142.9	970	90	
31 / 0000	17.6	144.4	976	90	
31 / 0600	17.8	146.1	980	90	
31 / 1200	18.0	147.8	984	85	
31 / 1800	18.2	149.6	991	75	
01 / 0000	18.1	151.3	1000	65	
01 / 0600	17.8	153.0	1000	55	tropical storm
01 / 1200	17.4	154.5	1002	45	
01 / 1800	17.0	156.1	1002	40	
02 / 0000	16.5	157.6	1005	35	
02 / 0600	16.1	159.0	1006	35	
03 / 0000	15.1	163.4	1009	30	tropical depression
03 / 0600	14.9	164.9	1009	30	
03 / 1200	14.7	166.5	1009	25	
03 / 1800	14.7	168.2	1009	25	
04 / 0000	14.7	170.0	1009	25	
04 / 0600	14.7	171.8	1009	30	
04 / 1200	14.6	173.6	1009	30	
04 / 1800	14.2	175.5	1010	30	
05 / 0000	13.7	177.4	1009	30	
05 / 0600	13.6	179.4	1009	30	moving out of central Pacific

Figure 2. Best Track for TD-01C



Tropical Depression One-C
15-17 August 2003

History. The first tropical cyclone of the season in the central Pacific, Tropical Depression (TD) 01-C, developed within an active portion of the monsoonal trough that formed in mid August to the southeast of the Hawaiian islands. The first CPHC advisory on TD 01-C was issued at 1800 UTC 15 August with the center near 13.8N 151.0W and estimated 30 KT winds in a small area north of the center. The depression was moving west at 10 KT remaining well south of the Hawaiian Islands with little effect on the islands' weather.
TD 01-C never strengthened further as it moved generally westward. By 0000 UTC 17 August, TD 01-C had weakened into a remnant low level circulation. This weak remnant circulation did maintain itself for several more days as it moved west toward the Dateline with deep convection occasionally flaring up. It passed just south of Johnston Atoll at 1800 UTC 18 August and crossed the International Dateline near 16N into the western Pacific on 20 August. By 0000 UTC 17 August, TD 01-C had weakened into a remnant low level

Synoptic Factors. Vertical wind shear was unfavorable for the development of TD 01-C as was the upper flow pattern that featured a large upper tropospheric trough to the northeast. The trough extended its cyclonically curved flow southwestward down over the depression. TD 01-C therefore did not develop beyond the tropical depression stage, and it commenced weakening on 16 August as the deep convection dissipated.

Hurricane Jimena 28 August - 5 September 2003

History. Tropical Depression 10-E formed around 0600 UTC 28 August from an area of convection some 1500 nmi east southeast of Hilo, Hawaii. The depression gained tropical storm intensity at 1800 UTC 28 August and was named Jimena. Tropical Storm Jimena continued the rapid strengthening trend and reached hurricane force just 18 hours later at 1200 UTC 29 August about 1200 miles east-southeast of Hilo.

Hurricane Jimena continued to develop as it moved just north of due west and directly toward the Hawaiian Islands. Jimena crossed 140W and entered the CPHC's area of responsibility at 0600 UTC 30 August, with maximum winds of 85 KT. Jimena continued its intensification for another six hours, reaching 90 KT, category 2 on the Saffir-Simpson scale, at 1800 UTC 30 August while about 700 nmi east of the Big Island of Hawaii. Jimena began to slowly weaken after 0600 UTC 31 August while continuing to move west- northwestward toward the Big Island of Hawaii. Jimena lost strength dramatically beginning about 1800 UTC 31 August as it came under strong upper level shear from the south. At about that time, the first of a series of flights by the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command commenced. Data from the first flight indicated the strongest flight-level (700-hPa) wind speed was 71 KT with the lowest pressure measured by dropwindsonde of 990-hPa. Jimena began to turn and track south of due west after 0000 UTC 1 September, and weakened further, rapidly dropping below hurricane force by 0600 UTC 1 September when it was located a few hundred miles south-southeast of the Big Island of Hawaii. Tropical Storm Jimena passed about 105 nmi south of South Point on the Big Island of Hawaii about 1500 UTC 1 September. Tropical Storm Jimena continued to weaken as it moved west-southwest, well south of the remainder of the Hawaiian Islands. Jimena dropped below Tropical Storm strength by 0000 UTC 3 September, when it was about 400 miles southwest of Kauai. Tropical Depression Jimena continued to track westward, eventually crossing the Dateline and out of CPHC's area of responsibility after 0600 UTC 5 September.

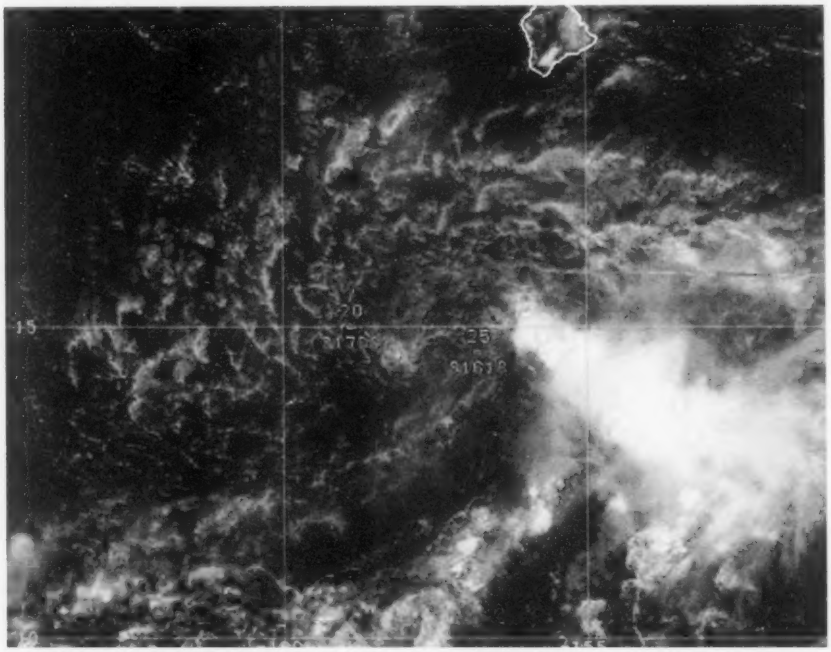
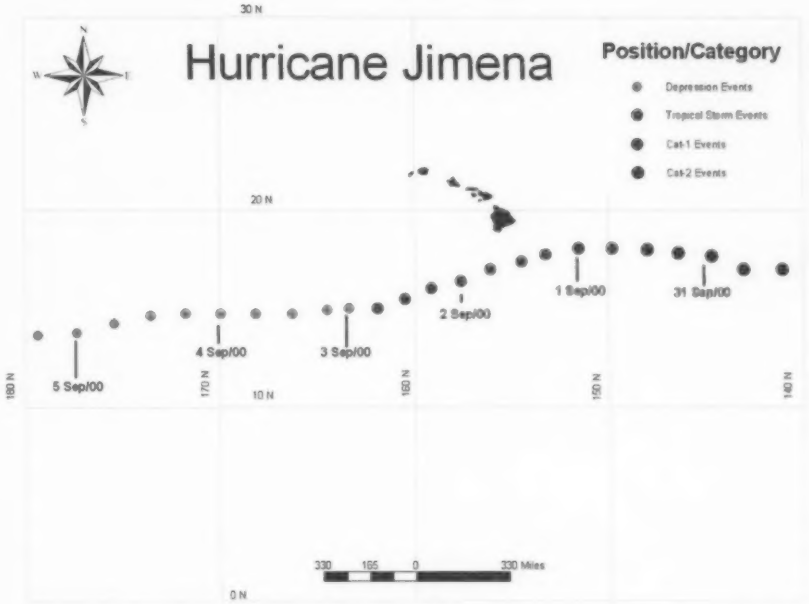


Figure 3. Visible satellite image of 01-C taken at 2100 UTC 16 August. Dots on the image are the initial and forecast positions from the 2100 UTC forecast bulletin. Plotted values are the maximum forecast winds (above dot) and position valid date/time (below dot) in MDDHH format.

Synoptic Factors. Deep easterlies controlled Jimena's movement in the early days of her development through 1200 UTC 31 August when Hurricane Jimena, with winds up to 90 KT, was moving in the direction of the Big Island of Hawaii. Beyond this time, Jimena moved into an area of strong shear ahead of a trough sitting over the western Hawaiian Islands. This shear rapidly weakened the storm and allowed the surface center to begin moving west-southwestward with the lower level east northeasterly trade flow. Jimena continued to move with this low-level trade wind flow, further weakening to a tropical depression, again well south of the Hawaiian Islands. The trough over the Hawaiian Islands retarded any possible redevelopment. The storm passed westward south of 15N and across the Dateline before dissipating to a remnant low.

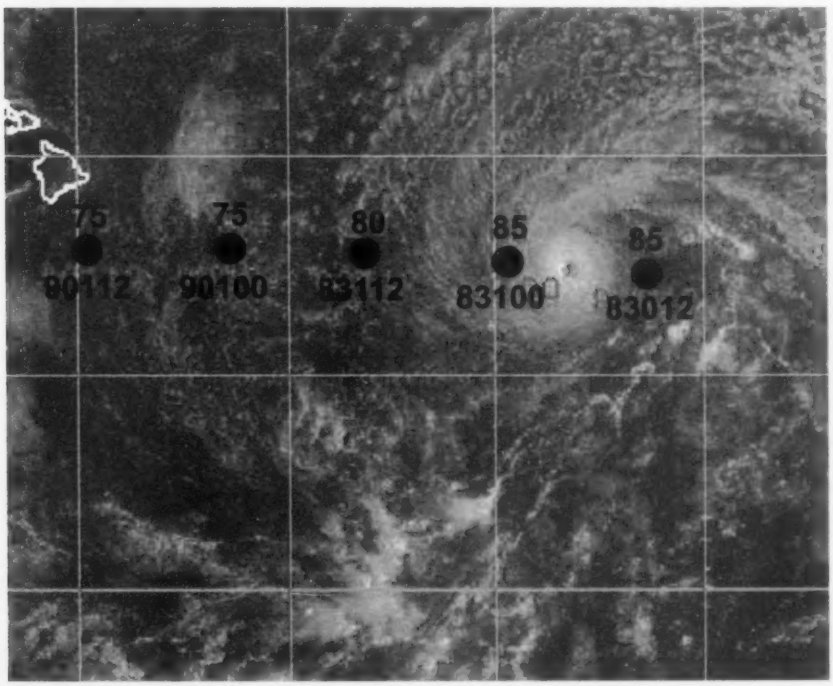
Impacts. Jimena was the first tropical storm or hurricane to pose a considerable threat to Hawaii since Daniel in 2000. Based upon forecasts initially by the Tropical Prediction Center (TPC) and continued by the CPHC of Jimena passing about 50 nmi south of the Big Island, a Hurricane Watch was posted at 0000 UTC 31 August for the Big Island. This was followed by a Tropical Storm Warning posted at 0300 UTC 1 September. Ultimately the center of Jimena passed a little more than 100 nmi south of the Big Island as a weakening and increasingly disorganized tropical storm. Thus the effects on the Big Island were minimal.

Figure 4. Best Track for Jimena



Highest wind gusts were 46 KT at South Point and 50 KT on Kahoolawe which is exposed to accelerated winds flowing between Maui and the island of Hawaii. Jimena produced rainfall amounts of 6 to 10 inches, with higher isolated amounts, across the windward sections of the Big Island. No significant flooding occured. High surf with heights of 6 to 12 feet was reported along the southeast-facing shores of the Kau district and up to 11 feet along the coast just north of Hilo on the island of Hawaii. The Hurricane Watch was discontinued at 1500 UTC 1 September with the Tropical Storm Warning cancelled at 2100 UTC 1 September.

Figure 5. Visible satellite image taken at 1900 UTC 31 August. Dots on the image are the initial and forecast positions from the forecast bulletin. Plotted values are the maximum forecast winds (above dot) and position valid date/time (below dot) in MDDHH format.



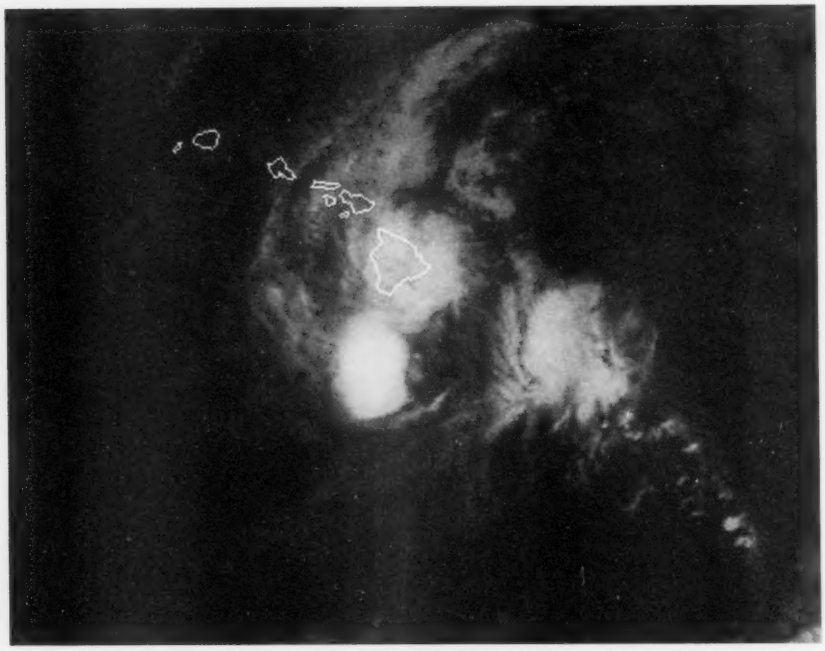


Figure 6. Infrared satellite imagery taken at 1600 UTC 1 September.

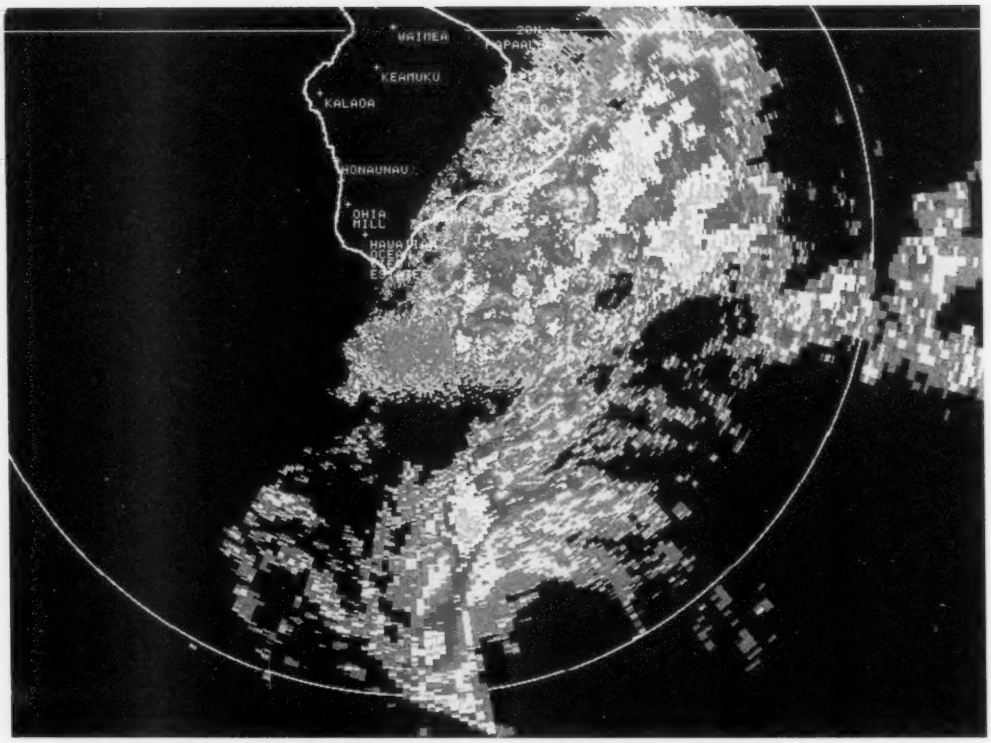


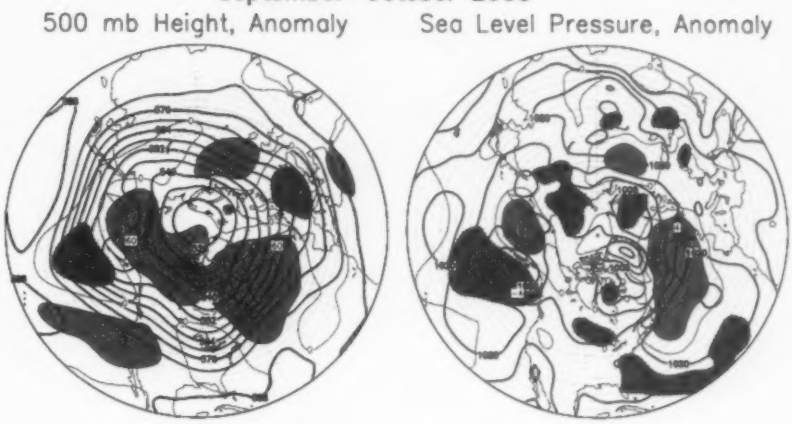
Figure 7. Radar reflectivity (0.5 degree elevation) from the South Hawaii 88D (PHWA) at 0345 UTC 1 September. The range ring denotes the 124 nm distance from the radar site.

MEAN CIRCULATION HIGHLIGHTS AND CLIMATE ANOMALIES

A. James Wagner
Senior Forecaster Forecast Operations Branch Climate Prediction Center /NCEP/NWS/NOAA

September - October 2003

The early fall period was characterized by extensive areas of above normal mid-tropospheric heights, both at high and low latitudes of the western part of the Northern Hemisphere. The entire area from the Bering Sea eastward across northern Canada and the adjacent Arctic Basin, along with nearly all of the Atlantic Basin north of about 40 N, had higher than normal 500-hPa heights. Significantly below normal heights were limited to troughs over the eastern half of the Pacific and the eastern third of the continental U.S. The southwestern U.S. was dominated by an anomalously strong northeastward extension of the eastern Pacific subtropical ridge. This pattern was associated with a continuation of the long European drought into October, as the sea level pressure pattern was more anticyclonic than usual. The circulation over the Atlantic was unfavorable for the development of autumnal extratropical storms, but was associated with the continuation of a very active tropical storm season over the Atlantic - Caribbean Basin, with four named storms forming in September and three on October. Anomalous anticyclonic circulation at both the surface and aloft was especially strong during September and was centered near Newfoundland. This pattern prevented several of the tropical cyclones from recurving and steered them into areas not normally visited by hurricanes. The most notable was Isabel, which made landfall in North Carolina and severely impacted the entire Middle Atlantic region of the U.S. Even though it had already weakened considerably from the earlier Category 5 status that it held for close to five full days when over the tropical Atlantic, Isabel brought Category 2 winds near landfall in North Carolina and did widespread damage from Category 1 and tropical storm force winds, as well as from flooding due to both heavy rains and a large storm surge that went as far north as the upper Chesapeake Bay. Power outages took weeks to repair in some locations due to the large number of downed trees, caused by a combination of unusually wet ground following months of heavier than normal rainfall preceding the storm making it easier than usual to uproot trees, and the fact that there had not been a widespread strong wind event in the area for decades. Other unusual events related to tropical activity were the passage of Hurricane Fabian very close to Bermuda with extensive damage caused by 115 mph winds, and the landfall or Hurricane Juan near Halifax, Nova Scotia, where it was the most damaging tropical cyclone in decades.

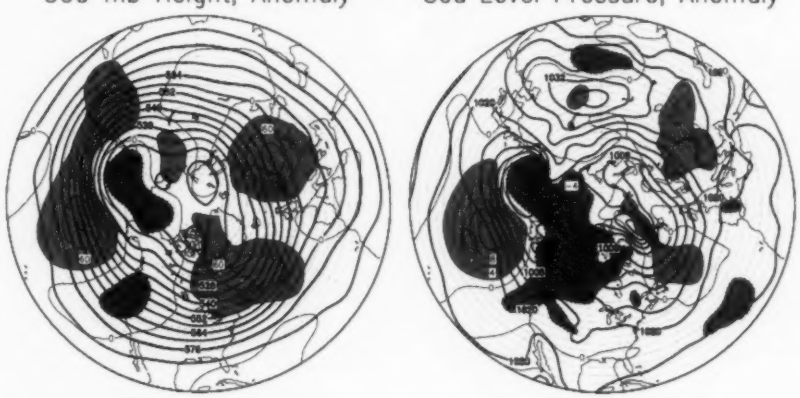


The extensive tropical storm activity in these two months shows graphically on the mean sea level pressure map as a channel of below normal SLP over the southwestern Atlantic Basin. The ridge over the southwestern U.S., which remained strong well into October, was associated with a continuation of unusually hot and dry weather far into the fall, accompanied by a worsening of drought conditions and the prolongation of an already bad wildfire season. During October the middle tropospheric troughs over the eastern Pacific, northeastern U.S. and Europe all became considerably stronger than normal.Over the tropical Pacific, the El Nino/Southern Oscillation (ENSO) phenomenon continued in the neutral range, although most of the equatorial Sea Surface Temperatures were on the plus side of normal. The only sea surface temperatures (SST) capable of supporting widespread convection were centered near and just west of the date line, however, and all atmospheric indices use to monitor ENSO remained in neutral territory.

The eastern Pacific tropical cyclone season concluded in October, with 16 named storms, close to the normal total number. On the other hand, the same number of named storms in the Atlantic Basin represented a well above normal total there. With ENSO about neutral, other factors, such as an active summer rainy season and northward-displaced monsoon in West Africa, extensive areas of above normal SSTs, and deeper than normal easterly flow, all contributed to the very active and long Atlantic season, which began with the earliest named storm on record (Ana) in April, and ended with two late tropical storms (Odette and Peter) in December, after the official end of the season on 30 November.

November - December 2003

During the late fall and early winter months, the subtropical ridge over the Pacific was much stronger than normal and the westerlies and associated extratropical storm tracks were pushed north of their usual position. Moderately amplified troughs and cyclonic activity were found only over the extreme northwestern Pacific and the eastern part of the Pacific, near the U.S. west coast. Middle tropospheric heights continued to average well above normal over the northwestern Atlantic, as well as over eastern Europe and western Russia, while heights were only slightly below normal over the eastern Atlantic and Mediterranean area. During November the eastern European ridge and eastern Atlantic trough couplet was the strongest anomaly, while in December the entire north Atlantic and northeastern Canada were covered by well above normal 500-hPa heights while conditions over Europe were not far from normal. Generally below normal heights over western Canada and greater than normal southerly components in the mean flow over central Canada were unfavorable for the buildup of Arctic air until early December. During the first week of November, the Bermuda High built strongly over the southeastern U.S., and record high temperatures were observed at many locations in the eastern part of the country. It was not until early December that the first substantially colder than normal airmass and significant snow appeared over the northeastern U.S. in response to the increasing amount of blocking over the Davis Strait and northeastern Canada. Hudson Bay did not freezeover completely until late in December, considerably later than usual. The trough near the Pacific Coast became stronger and took on a negative (northwest to southeast) tilt in December, when it brought significantly above normal precipitation to most of the West Coast, especially to Oregon and northern California. By the end of the month, heavy rains reached southern California, where they caused extensive mudslides on slopes denuded of trees and vegetation by the wildfires a couple of months earlier. Over the equatorial Pacific, atmospheric and oceanic indices of the status of the El Nino/Southern Oscillation (ENSO) all remained within a neutral range throughout the two-month period. Warmest equatorial SSTs again remained near and west of the date line, and this was the only area of substantially enhanced convective activity, since SSTs, though above normal, were not high enough to support convection anywhere east of the dateline.



The author is the Senior Forecaster in the Forecast Operations Branch of the Climate Prediction Center /NCEP/NWS/NOAA. He participates in the preparation of all the types of forecasts done in the Branch : the 6-10 Day Extended Outlooks, Week Two Outlooks, Weekly Hazards Assessment, Monthly Outlooks, and the series of long-lead Seasonal Outlooks going out to a year ahead. Other duties of Mr. Wagner include applied research in developing tools for the various types of forecasts and giving special briefings on the forecasts and their methodology to the media and visiting scientists.

Back to the Northeast for the Newest Port Meteorological Officer.

By Robert A. Luke (U.S. VOS Program Lead)

We would like to welcome Jim Luciani as the Newark/New York City Port Meteorological Officer (PMO). Who says that you cannot go home again? Jim was born and raised in Owego NY (near Binghamton) and his wife is from Rochester NY. "Relocating closer to our roots, was a big factor in applying for the Newark position," said Jim. "I am not looking forward to the cold winters again, but being much closer to family and experiencing the change of seasons again are great!"

Jim enlisted in the US Navy at the ripe age of 24. "I was working in a very boring job when I decided to join the Navy. It was all about a challenge; or as the recruiting posters said, 'It's not just a job, it's an Adventure.'
"I was looking for a job that would not be boring; weather certainly fit that bill," said Jim. Following boot camp at Great Lakes, in the fall/winter of 1981, Jim reported to Navy Basic school at Chanute AFB, Rantoul IL. Jim's first assignment was the Mobile Environmental Team in San Diego.

His experiences aboard ships of all sizes and types, including the Battleship **New Jersey** (BB-62) convinced him that a Naval career was well suited to him. Follow on tours included NAS Willow Grove, PA (1985-1988), Forecasting school back at Chanute (1988), Pearl Harbor HI (1988-1991), **USS George Washington** (CVN-73) (1991-1995), Naples, Italy (1997-2000) and a twilight tour as an Weather Instructor at Keesler AFB MS. He was also selected for EEAP, a Naval program that gave him two years free from his normal duties to earn an Associates Degree in Computer Art.

After a 22 year career Chief Luciani retired from military service in September of 2003. He briefly held a position as a data analyst at the National Data Buoy Center in MS, before accepting the position as the Newark PMO. "I look forward to meeting face to face with the sailors and helping them, help us," reported Jim.

Jim's wife of 15 years is Susan Bradshaw. He has a daughter, Jacquelyn (13), a son, Nickolas (6), and 2 beagles (Wiley and Oliver).

Queen Mary II
What a Ship!

The huge QMII in Port Everglades Florida.
Photography by Bob Drummond, PMO Miami,
submitted by Russell (Rusty) Pfost
National Weather Service
Weather Forecast Office (WFO)
Miami, FL 33165

We would like to invite all our readers to submit articles, photographs, ideas, or suggestions through out the year.

NOTICE

AMVER /SEAS COMMUNICATION TRANSMISSION PROCEDURES CHANGED

JANUARY 2004

The AMVER/SEAS communication procedures have been revised due to an address change along with new transmission procedures issued by "Telenor" in transmitting the Amver/Seas binary message Via the various Inmarsat "C" Units.

Please disregard the previous Amver/Seas address 31102030798481 located in the text of this manual.

The new instructions for transmitting the Amver/Seas messages for the AOR(W), AOR(E), POR, and IOR are covered on the following seven (7) pages.

IMPORTANT

For more information or assistance, please contact your local PMO or visit "vos@noaa.gov"

AMVER /SEAS COMMUNICATION TRANSMISSION PROCEDURES CHANGED

**********************************IMPORTANT**************************************

1.) It is necessary to setup an address for the AMVER/SEAS message in the Standard C software. The SETUP procedure provided below is a one-time process to be completed on initial installation.

2.) The TRANSMISSION instructions provided below are to be followed each time a message is transmitted.

3.) These instructions may vary slightly, depending on the software version and hardware.

****

AMVER /SEAS COMMUNICATION
TRANSMISSION PROCEDURES CHANGED

THRANE AND THRANE SOFTWARE
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR) AND INDIAN OCEANS (IOR) PROCEDURES (continued)

1. At the MAIN MENU highlight TRANSMIT and Press <ENTER>. Press the space bar to open the Addressbook with the address created during setup.

2. Highlight AMVER/SEAS address file and Press <ENTER>

3. The cursor should be on the Land Station field. Press the space bar to view the station list. Highlight the correct CES/LES and Press <ENTER> to accept.

AOR (W)	Southbury	001
AOR (E)	Southbury	101
POR	Santa Paula	201
IOR	Eik (Oslo)	304

**********No other stations can relay the messages**********

4. Tab the cursor to the "TEXT IN EDITOR" field which will be marked with an "X". Press the space bar to remove the "X" and the word "FILE" will appear.

5. Highlight the FILE option and press the space bar to display a list of files located on the diskette. Highlight the appropriate file name and press <ENTER>.

6. Highlight the REQUEST CONFIRMATION option and press the space bar to remove the "X". Move the cursor to SEND and press <ENTER>.

NOTE: The following are the FILE NAME for each particular message.

—Meteorological Observation	MET.BIN
—Sail Plan	SP.BIN
—Arrival Report	FR.BIN
—Deviation Report	DR.BIN
—Administrative Report	ADMIN.BIN

AMVER /SEAS COMMUNICATION
TRANSMISSION PROCEDURES CHANGED

TRIMBLE SOFTWARE
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR) AND INDIAN OCEANS (IOR) PROCEDURES

SETUP PROCEDURES

1. At the MAIN MENU highlight SETUP option and press <ENTER>. Select MAIL ADDRESS and Press <ENTER>. Select INSERT MAIL ADDRESS and Press <ENTER>. Press <ENTER> twice to display the EDIT ADDRESS Screen.

2. At the EDIT ADDRESS section the ENTER NAME FILE will appear and enter AMVER/SEAS (This is the name of the file).

Tab to PRESENTATION, this field defaults to IA5 (7-bit. All Networks.) Press <ENTER> to view options. Select BINARY (8-Bit, No Telex)

.

Tab to DATA FORMAT field. The STANDARD (All Presentations) is displayed as the default. If not selected, press enter to view options. Select Standard (All Presentations.) Press <ENTER>

. Tab to PREFIX FIELD and type in SEAS into this field. (This is the SPEC ACCESS CODE) Leave the Country Code, Destination, and Extension fields BLANK.

Tab to CES/LES and press <ENTER>. Select the appropriate Land Station corresponding to your ships location press <ENTER>.

AOR (W)	Southbury	001
AOR (E)	Southbury	101
POR	Santa Paula	201
IOR	Eik (Oslo)	304

**********No other stations can relay the messages**********

APPENDIX (A): SETUP/TRANSMISSION PRODECURES

At the DELIVERY NETWORK select SPEC ACCESS CODE and Press <ENTER>

.

Press ESC to exit the Edit Address menu, continue to press ESC until the program returns to the Main Menu. The AMVER/SEAS address is now saved in the Address Book and is available for transmission of meteorological observations.

AMVER /SEAS COMMUNICATION
TRANSMISSION PROCEDURES CHANGED

TRIMBLE SOFTWARE
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR) AND INDIAN OCEANS (IOR) PROCEDURES (continued)

SET-UP Procedures (continued)

1. Place DATA DISK in TRIMBLE INMARSAT "C".

2. Select SETUP from Main Menu <ENTER>. Highlight FILE DIRECTORY SETUP <ENTER>. At Directory Setup ensure the first line (MESSAGE DIRECTORY) indicates only A:\

3. At MAIN MENU select COMPOSE <ENTER>. Highlight SEND MESSAGE <ENTER>. Message will appear (MET.BIN) or Other Appropriate File <ENTER>.

4. At the ADDRESS INDEX highlight the entry AMVER/SEAS <ENTER>

5. Select MSG OPTION highlight SEND MESSAGE <ENTER>. A message will be displayed letting you know that the Message was put in the outgoing mailbox.

NOTE: The following are the FILE NAME for each particular message.

—Meteorological Observation	MET.BIN
—Sail Plan	SP.BIN
—Arrival Report	FR.BIN
—Deviation Report	DR.BIN
—Administrative Report	ADMIN.BIN

AMVER /SEAS COMMUNICATION
TRANSMISSION PROCEDURES CHANGED

JRC (JAPAN RADIO COMPANY)
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR)
AND INDIAN OCEANS (IOR) PROCEDURES

SETUP AND TRANSMISSION PROCEDURES

1. At the MAIN MENU select TRANSMIT. Select SPECIAL ACCESS NETWORK and Press <ENTER>.

The SPECIAL ACCESS NETWORK window appears. Press <ENTER>. Type in the word SEAS and Press <ENTER>.

Ensure FILE NAME: A:\MET.BIN (Or Other Appropriate File) By using A:\ you are telling the program to read the file on the diskette and not the text in editor.

Arrow down to LAND EARTH STATION and Press <ENTER>. Type in your LES/CES CODE corresponding to your ships location and press <ENTER>

AOR (W)	Southbury	001
AOR (E)	Southbury	101
POR	Santa Paula	201
IOR	Eik (Oslo)	304

**********No other stations can relay the messages**********

Ensure POSITION: OFF

Arrow down to CHARACTER CODE <ENTER>. Use the Arrow key to Highlight DATA.(Ensure this is completed, because you are transmitting a Binary message)

Arrow down to DELIVERY CONFIRMATION and Press <ENTER>. Use the Arrow Key to highlight OFF and Press <ENTER>.

2. Press F1 (This will SEND THE MESSAGE).

NOTE: The following are the FILE NAME for each particular message.

—Meteorological Observation	MET.BIN
—Sail Plan	SP.BIN
—Arrival Report	FR.BIN
—Deviation Report	DR.BIN
—Administrative Report	ADMIN.BIN

AMVER /SEAS COMMUNICATION
TRANSMISSION PROCEDURES CHANGED

FURUNO
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR) AND INDIAN OCEANS (IOR) PROCEDURES

NOTE: Furuno first started installing the *FELCON 11* model hardware in the middle 90's for their version of the INMARSAT "C" to work with the GMDSS. This model could not generate a Binary message to be used with our AMVER/SEAS software.

The Furuno company has updated their hardware to the *FELCOM 12*. This new hardware will allow an AMVER/SEAS Binary message to be transmitted on their INMARSAT "C"

SETUP PROCEDURE

1. At the FURUNO Main Menu, Press F8 (SETUP). The SETUP WINDOW menu comes up on the screen.

2. Select NO.9 (CONFIGURATION) and Press <ENTER>. Select NO.1 (STATION LIST) and press <ENTER>. Arrow down to a blank file number at the end of the list and Press <ENTER>.

3. A window appears asking for: Use <ENTER> when line is highlighted to type in information and press <Enter>to accept typed in data. Use arrow keys to get to next line.

Station Name: Enter---AMVER/SEAS
Arrow down to DESTINATION TYPE: Select SPEC
Arrow down to STATION ID: Enter in the word SEAS. Leave the Prefix and Country Code Blank.
Arrow down to REMARKS: Enter—AMVER/SEAS and press <ENTER>.

4. Press ESC until you return to the FURUNO MAIN MENU.

AMVER /SEAS COMMUNICATION
TRANSMISSION PROCEDURES CHANGED

FURUNO
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR)
AND INDIAN OCEANS (IOR) PROCEDURES (continued)

1. Insert the diskette with the BINARY message that was generated with the AMVER/SEAS program.

2. Press F3 (TRANSMIT). Select NO. 1 (TRANSMIT MSG) and Press <ENTER>. The Transmit Message window appears.

Arrow DOWN to MESSAGE FILE and Press <ENTER>. This will allow you to see the files stored on the diskette. Select the APPROPRIATE FILE message and Press <ENTER>.

Arrow DOWN to STATION NAME and Press <ENTER>. Select STATION AMVER/SEAS and Press <ENTER>.

Arrow DOWN to CES/LES ID and Press <ENTER>. Select the proper LES/CES and Press <ENTER>. AOR (W) Southbury 001, AOR (E) Southbury 101, POR Santa Paula 201 and IOR Eik (Oslo) 304.

Arrow DOWN to OPTION and Press <ENTER>. Arrow down to CONFIRMATION and select OFF and Press <ENTER>. Arrow down to CODE and Press <ENTER>. Select the word DATA and Press <ENTER>. (Ensure DATA is selected, because the AMVER/SEAS message is sent as a BINARY message.)

Press <ESC>. Arrow DOWN toTRANSMIT and Press <ENTER>. A small SEND START window appears and SELECT YES and Press <ENTER>. The message is now being sent through the satellite.

3. To see the Status of the Message being sent—Press F6 (LOGS).

NOTE: The following are the FILE NAME for each particular message.

—Meteorological Observation	MET.BIN
—Sail Plan	SP.BIN
—Arrival Report	FR.BIN
—Deviation Report	DR.BIN
—Administrative Report	ADMIN.BIN

Shift Colors! Environment Canada VOS Program Manager Ron Fordyce Retiring

Robert A. Luke (U.S. VOS Program Lead) and Randy Mawson (Environment Canada)

Ron (on right) is seen here accepting his retirement certificate from Regional Director, Roger Street. Former Canadian Prime Minister Jean Chrétien signed the certificate.

Ron Fordyce, Supervisor of the Port Meteorological Office in Hamilton Ontario and the Program manager for Environment Canada's Voluntary Observing Ship (VOS) program retired in January of this year after 38 years of dedicated service. Ron (on right) is seen here accepting his retirement certificate from Regional Director, Roger Street. Former Canadian Prime Minister Jean Chrétien signed the certificate.

Ron was well known in the world marine community for his vast knowledge, experience and friendly demeanor. He had enormous experience dealing with the World Meteorological Organization in his marine role.

Ron plans to enjoy his retirement years vacationing at a small cottage in northern Ontario. We wish Ron and his family the best that life has to offer and he will be sorely missed.

Editor's note: Ron has been a true friend, colleague, and mentor to the U.S. VOS program. His guidance and wisdom aided in the smooth transition of our program to Mississippi three years ago. Thank you Friend -- Luke

VOS Program Awards 1999

MARIE MAERSK

E-SHIPS ENDURANCE

CSX CRUSADER

ZIM USA

I apologize for the late posting of these awards. It took the PMO to move to Charleston to get his office cleaned up. – Luke

National Weather Service VOS Program New Recruits From November 1, 2003 to January 1, 2004

Name of Ship	Call	Agent Name	Recruiting PMO
AMERICA STAR	GZKA		HOUSTON, TX
CSCL XIAMEN	A8CL6	CHINA SHIPPING (NORTH AMERICA)	NORFOLK, VA
DISNEY MAGIC	C6PT7	DISNEY CRUISE LINE, ATTN: 1ST OFF. C	JACKSONVILLE, FL
JAPAN SENATOR	9WCR2	ANDERS WILLIAMS SHIP AGENCY, INC.	NORFOLK, VA
ENS MAERSK	OYYK2	MAERSK LINE	NEW YORK CITY, NY
MAERSK DAMMAM	V2OE3	MAERSK-SEALAND	SAN FRANCISCO, CA
MARINE CHEMIST	KMCB		HOUSTON, TX
MIKI MIKI	WTW9266	MIKI MIKI C/O SAUSE BROS OCEAN TOWING CO	KODIAK, AK
MORMACSUN	WMBK		HOUSTON, TX
ORIENTE CREST	HPFA	RAINBOW MARITIME CO., LTD	SEATTLE, WA
PACIFIC AVENGER	WCY8175	PACIFIC AVENGER C/O SEA COAST TOWING	KODIAK, AK
SEA HAWK	WDA3282	SEA HAWK C/O SEA COAST TOWING	KODIAK, AK
SEABULK COURAGE	WCY8453	SEABULK COURAGE C/O SEABULK INTERNATIONAL	KODIAK, AK
STELLAR VOYAGER	C6FV4	CHEVRON TEXACO SHIPPING CO., LLC	SEATTLE, WA
TALLAHASSEE BAY	WRA4829	KEYSTONE BARGE SERVICES INC. SUITE 600	HOUSTON, TX
USCGC HICKORY	NXZJ	USCGC HICKORY	ANCHORAGE, AK

-- Welcome Aboard and Thanks! -- Luke

2003 VOS Outstanding Performers

SHIP AWARD WINNERS

APL JAPAN
APL SINGAPORE
ARCTIC SUN
ARGONAUT
BERNARDO QUINTANA A
BRIGHT STATE
BRUCE
CAP SAN ANTONIO
CAPTAIN STEVE L BENNET
CARNIVAL PARADISE
CHESAPEAKE BAY
CLEVELAND
COLUMBUS VICTORIA
CROWLEY UNIVERSE
EDGAR B. SPEER
EDYTH L
ENTERPRISE
EWA
FRANCES L
GEYSIR
GREEN POINT
GUARDIAN
HATSU ENVOY
HOOD ISLAND
HORIZON ANCHORAGE
HORIZON CHALLENGER
HORIZON CRUSADER
HORIZON DISCOVERY
HORIZON HAWAII
HORIZON KODIAK
HORIZON PACIFIC
HORIZON PRODUCER
HORIZON SPIRIT
HORIZON TACOMA
INDIANA HARBOR
ISLA DE CEDROS
JACKLYN M
JAMES R. BARKER

SHIP AWARD WINNERS

LYKES DISCOVERER
LYKES LIBERATOR
LYKES NAVIGATOR
M/V KENNICOTT
M/V LIBERTY
M/V PATRIOT
M/V SEABULK PRIDE
M/V TUSTUMENA
MAUI
NAVIGATOR
NAVIGATOR OF THE SEAS
NOAA SHIP GORDON GUNTER
NOAA SHIP OREGON II
NOAA SHIP RONALD H BROWN
PAUL TREGURTHA
POLAR EAGLE
PRESIDENT ADAMS
PRESIDENT JACKSON
PRESQUE ISLE
SAUDI ABHA
SEABULK MONTANA
SEALAND ARGENTINA
SEALAND COMMITMENT
SEALAND INNOVATOR
SEALAND INTEGRITY
SEALAND MOTIVATOR
SEALAND PATRIOT
SEALAND PRIDE
SELMA KALKAVAN
SENECA
SINUK
SOLAR WING
STAR ISTIND
TUG MALOLO
TUG NORTHERN SPIRIT
TUG PARAGON
WESTWOOD MARIANNE
WESTWOOD RAINIER

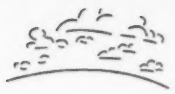
COMPANY AWARD WINNERS

LYKES LINES LIMITED LLC
MAERSK SEALAND

VOS Cooperative Ship Report: January through December 2003

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
JAG PRAKASH	AUBK	Anchorage	0	0	0	0	0	76	60	87	47	2	36	25	333
POLAR EAGLE	ELPT3	Anchorage	100	75	107	89	32	117	171	175	176	207	216	227	1692
ARCTIC SUN	ELQB8	Anchorage	92	92	106	97	89	86	153	201	195	199	205	214	1729
HORIZON ANCHORAGE	KGTX	Anchorage	60	61	94	89	91	82	72	75	47	39	154	115	979
HORIZON TACOMA	KGTY	Anchorage	37	43	79	87	63	87	80	66	48	65	93	46	794
HORIZON KODIAK	KGTZ	Anchorage	66	52	100	60	42	20	33	80	60	51	67	47	678
TMM TABASCO	VSUA5	Anchorage	5	4	0	0	0	0	0	0	0	0	0	0	9
LYKES EAGLE	VSUA7	Anchorage	10	7	0	0	0	0	0	0	7	3	8	5	40
AGRIUM	WAB930	Anchorage	53	29	38	48	38	41	21	2	0	0	0	0	270
OCEAN RANGER	WAM7635	Anchorage	2	0	0	0	0	0	0	0	5	5	0	20	32
PANDALUS	WAV7611	Anchorage	0	0	0	1	22	0	0	0	0	0	0	0	23
WESTERN NAVIGATOR	WAX7602	Anchorage	0	0	0	0	0	4	7	9	5	17	0	0	42
GALE WIND	WAZ9548	Anchorage	12	3	9	1	5	12	18	7	13	11	1	15	107
POINT BARROW	WBM5088	Anchorage	0	0	0	0	0	0	3	1	13	0	0	0	17
SEA RANGER	WBM8733	Anchorage	0	0	0	0	14	16	20	20	34	0	0	0	104
SEA HORSE	WBN4382	Anchorage	0	0	0	0	0	0	0	0	0	29	0	0	29
PT. THOMPSON	WBN5092	Anchorage	0	0	0	0	0	3	26	10	6	35	0	0	80
GUARDSMAN	WBN5978	Anchorage	0	0	0	0	0	0	36	6	0	2	34	96	174
GLADIATOR	WBN5982	Anchorage	0	0	0	0	0	0	2	0	0	0	5	8	15
SIOUX	WBN7617	Anchorage	2	0	0	0	0	10	0	0	0	0	0	0	12
SENECA	WBN8469	Anchorage	0	0	0	0	36	135	187	146	161	80	0	0	745
GUARDIAN	WBO2511	Anchorage	0	0	0	1	69	198	103	80	49	32	0	9	541
NAVIGATOR	WBO3345	Anchorage	44	68	100	113	15	36	66	58	55	67	0	0	622
SEA VENTURE	WCC7684	Anchorage	14	0	1	0	0	10	0	0	44	19	0	0	88
SEA VIKING	WCE8951	Anchorage	7	0	0	0	0	14	0	0	70	1	0	0	92
OCEAN MARINER	WCF3990	Anchorage	0	0	0	0	14	8	2	0	0	13	51	0	88
REDOUBT	WCG3013	Anchorage	1	0	0	0	0	10	0	3	6	9	1	0	30
SIKU	WCQ6174	Anchorage	0	0	0	0	3	2	0	0	1	11	7	0	24
SINUK	WCQ8110	Anchorage	0	0	0	95	162	220	162	152	139	88	0	0	1018
CROSS POINT	WCW8728	Anchorage	0	0	0	0	0	1	0	0	0	0	0	0	1
SEABULK MONTANA	WCW9126	Anchorage	84	91	52	97	102	44	98	29	22	62	113	72	866
SEA VICTORY	WCY6777	Anchorage	31	0	0	0	0	13	0	0	0	1	0	0	45
PACIFIC TITAN	WCZ6844	Anchorage	0	0	0	0	0	0	0	3	3	0	0	0	6
ISLAND CHAMPION	WCZ7046	Anchorage	0	0	0	0	0	0	1	0	0	5	0	0	6
PT BROWER	WDA2796	Anchorage	0	0	0	0	0	1	233	170	0	0	0	0	404
GULF TITAN	WDA5598	Anchorage	0	0	0	0	0	0	0	0	0	11	10	0	21
ISLAND WARRIOR	WDA9217	Anchorage	0	0	0	0	0	0	0	4	10	12	0	1	27
NORTHERN LIGHTS	WFJK	Anchorage	64	4	2	0	2	0	0	0	0	0	0	0	72
TYONEK	WMH8	Anchorage	13	10	12	11	6	5	13	1	0	0	0	0	71
OCEAN NAVIGATOR	WSC2552	Anchorage	0	0	0	0	0	0	0	0	0	0	3	0	3
ALASKA MARINER	WSM5364	Anchorage	0	3	0	0	0	3	5	0	13	0	0	14	38
BRUCE	WWU8	Anchorage	25	33	23	30	39	39	34	37	40	43	27	26	396
R/V TIGLAX	WZ3423	Anchorage	0	0	0	0	1	1	8	15	15	0	3	0	43
Anchorage Ships: 44		Totals:	722	575	723	819	845	1294	1614	1437	1284	1119	1034	940	12406

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MAERSK TAIKI	9VIG	Baltimore	0	0	0	0	0	0	28	61	0	25	65	16	195
PREMIUM DO BRASIL	A8BL4	Baltimore	0	0	0	0	0	0	0	0	0	43	54	32	129
EVER GENERAL	BKHY	Baltimore	15	0	0	0	0	0	0	0	0	0	0	0	15
EVER GOODS	BKHZ	Baltimore	12	8	2	0	0	0	0	0	0	0	0	0	22
M/T SUN VOYAGER	C6FD3	Baltimore	37	0	8	0	0	4	41	26	21	72	30	19	258
CAPELLA VOYAGER	C6FD4	Baltimore	32	31	79	32	17	2	13	17	25	15	0	0	263



Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
GALAXY	C6FU6	Baltimore	0	0	0	0	0	0	12	11	9	12	9	3	56
CHIQUITA SCANDINAVIA	C6KD4	Baltimore	52	49	63	54	62	70	68	72	67	48	48	49	702
CHIQUITA ITALIA	C6KD5	Baltimore	0	0	5	43	50	52	51	53	51	65	61	61	492
CHIQUITA NEDERLAND	C6KD6	Baltimore	53	41	55	48	58	47	51	35	39	51	25	13	516
CHIQUITA BELGIE	C6KD7	Baltimore	60	46	45	45	43	49	24	28	35	50	51	32	508
CHIQUITA DEUTSCHLAND	C6KD8	Baltimore	79	54	59	34	66	65	60	64	62	69	67	70	749
CHIQUITA SCHWEIZ	C6KD9	Baltimore	56	46	43	45	51	55	56	46	50	57	44	59	608
ORION VOYAGER	C6MC5	Baltimore	13	12	18	37	37	28	50	33	14	15	1	28	286
TROJAN STAR	C6OD7	Baltimore	43	13	69	64	0	0	0	0	41	76	46	26	378
ALTAIR VOYAGER	C6OK	Baltimore	0	14	14	9	16	33	15	9	13	12	33	79	247
EDYTH L	C6YC	Baltimore	71	47	52	42	41	28	19	21	34	17	43	38	453
FRANCES L	C6YE	Baltimore	34	24	79	36	48	57	74	61	46	40	23	29	551
HADERA	ELBX4	Baltimore	41	28	50	14	48	6	0	18	93	12	0	0	310
OURO DO BRASIL	ELPP9	Baltimore	7	1	21	45	38	74	69	76	36	0	0	0	367
SOL DO BRASIL	ELQQ4	Baltimore	22	48	0	0	0	32	37	41	37	53	34	12	316
PITTSBURG	ELTQ6	Baltimore	69	60	67	54	59	59	64	58	57	62	64	75	748
SAUDI ABHA	HZRX	Baltimore	82	46	48	58	66	44	63	19	67	62	0	52	607
MAERSK ALASKA	KAKF	Baltimore	29	39	0	0	35	49	36	0	25	39	66	55	373
MAERSK ARIZONA	KAKG	Baltimore	2	0	5	32	39	18	8	0	6	10	0	0	120
TAKASAGO	LACR5	Baltimore	0	0	0	0	0	0	0	0	0	0	19	30	49
STAR HARMONIA	LAGB5	Baltimore	14	32	1	5	32	28	11	21	0	1	0	33	178
STAR ISMENE	LANT5	Baltimore	0	38	8	42	27	33	28	43	34	35	29	32	349
STAR HERDLA	LAVD4	Baltimore	31	67	15	36	40	23	48	48	29	1	31	6	375
STAR HIDRA	LAVN4	Baltimore	0	10	62	2	15	23	0	17	28	0	0	0	157
STAR ALABAMA	LAVU4	Baltimore	0	0	21	0	0	0	0	18	48	0	38	32	157
STAR EAGLE	LAWO2	Baltimore	51	87	32	69	33	33	19	30	0	38	18	20	430
TREIN MAERSK	MSQQ8	Baltimore	24	0	0	10	0	22	25	25	12	10	20	25	173
STAR INDIANA	S6BE	Baltimore	0	0	0	0	0	0	44	0	41	25	27	10	147
FIGARO	S6PI	Baltimore	58	8	0	0	0	0	0	0	0	0	0	48	114
MAERSK WIND	S6TY	Baltimore	0	0	0	0	0	0	0	0	2	16	8	6	32
ENERGY ENTERPRISE	WBJF	Baltimore	0	0	0	0	0	0	0	0	16	0	0	0	16
M/V RESOLVE	WCZ5535	Baltimore	45	28	17	33	36	15	21	34	31	33	32	33	358
M/V FREEDOM	WDB5483	Baltimore	0	0	0	0	0	0	0	0	0	0	21	18	39
GREEN LAKE	WDDI	Baltimore	20	0	0	0	42	21	37	29	10	11	0	0	170
M/V PATRIOT	WQVY	Baltimore	52	22	130	56	45	33	44	55	58	61	47	44	647
INDEPENDENCE	WRYG	Baltimore	33	4	107	0	60	0	29	31	36	11	36	14	361
LIBERTY	WRYX	Baltimore	48	52	66	46	55	28	50	2	0	18	33	26	424
GLOBAL SENTINEL	WRZU	Baltimore	0	0	0	0	0	0	0	0	0	2	2	0	4
PRIDE OF BALTIMORE II	WUW2120	Baltimore	0	0	0	0	38	73	25	39	39	21	20	5	260
ITB BALTIMORE	WXKM	Baltimore	11	29	23	0	8	11	0	0	21	9	9	5	126
GYPSUM KING	ZCAN2	Baltimore	0	0	0	13	0	0	0	0	0	0	0	0	13
COURTNEY L	ZCAQ8	Baltimore	0	0	0	18	27	8	10	24	29	19	20	29	184
DUHALLOW	ZCBH9	Baltimore	0	0	0	0	0	0	0	0	0	43	51	47	141
SKODSBORG	ZCIJ7	Baltimore	0	0	0	0	0	0	0	0	8	17	17	3	45
Baltimore Ships: 50	Totals:		1196	984	1264	1022	1232	1123	1230	1165	1270	1276	1242	1214	14218

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SEALAND RACER	MCDW2	Charleston	0	0	0	0	0	0	0	0	0	0	0	24	24
MAERSK CAROLINA	WBDS	Charleston	0	0	0	0	40	3	11	11	45	43	29	33	215
Charleston Ships: 2	Totals:		0	0	0	0	40	3	11	11	45	43	29	57	239

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
KIYI	KAO107	Chicago	0	0	0	0	0	0	2	11	5	10	0	0	28
SOUTHDOWN CHALLENGER	WA4659	Chicago	0	0	0	13	20	16	11	18	12	25	19	26	160
SUSAN W. HANNAH	WAH9146	Chicago	0	0	0	0	0	0	1	6	6	4	0	0	17

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
OGLEBAY NORTON	WAQ3521	Chicago	2	0	0	1	2	1	0	1	0	0	0	0	7
ALPENA	WAV4647	Chicago	0	0	0	0	0	0	0	0	0	0	3	4	7
SS BADGER	WBD4889	Chicago	0	0	0	0	0	15	12	5	14	3	0	0	49
KAREN ANDRIE	WBS5272	Chicago	0	0	0	3	1	1	1	7	4	3	7	0	27
KAYE E. BARKER	WCF3012	Chicago	0	0	0	0	0	0	0	0	0	14	4	29	47
INLAND SEAS	WCJ6214	Chicago	0	0	0	0	0	1	3	4	0	0	0	0	8
JACKLYN M.	WCV7620	Chicago	7	0	7	13	9	12	14	5	16	17	17	5	122
REBECCA LYNN	WCW7977	Chicago	1	0	1	12	18	12	27	12	7	15	3	5	113
MCKEE SONS	WCZ9703	Chicago	0	0	0	0	0	0	0	0	0	0	0	7	7
JOSEPH L. BLOCK	WDA2768	Chicago	5	0	0	1	0	0	0	0	0	0	0	0	6
WILFRED SYKES	WDA2769	Chicago	0	0	0	11	13	14	9	11	5	7	8	3	81
STEWART J. CORT	WDB4570	Chicago	0	0	0	0	0	0	0	0	9	25	16	16	66
BURNS HARBOR	WDB4745	Chicago	0	0	0	0	0	0	0	0	0	30	19	10	59
PHILIP R. CLARKE	WE3592	Chicago	0	0	0	10	3	4	12	1	5	9	3	0	47
JOHN G. MUNSON	WE3806	Chicago	6	0	19	6	3	8	17	12	0	4	16	1	92
ARTHUR M. ANDERSON	WE4805	Chicago	4	0	0	0	9	8	12	22	27	44	104	48	278
CASON J. CALLAWAY	WE4879	Chicago	46	0	0	1	2	39	0	0	66	46	15	28	243
RESERVE	WE7207	Chicago	0	0	0	1	3	0	0	0	0	0	0	0	4
EDGAR B. SPEER	WQZ9670	Chicago	14	3	3	23	52	35	49	161	130	102	136	29	737
MICHIGAN	WRB4141	Chicago	0	3	0	1	5	3	1	2	4	0	0	0	19
COLUMBIA STAR	WSB2018	Chicago	0	0	0	0	0	24	20	4	0	0	11	5	64
BARBARA ANDRIE	WTC9407	Chicago	2	0	0	1	2	1	0	4	2	1	0	0	13
LEE A. TREGURTHA	WUR8857	Chicago	0	0	0	0	0	1	0	0	0	0	0	0	1
INDIANA HARBOR	WXN3191	Chicago	10	0	0	6	135	91	138	59	23	0	84	0	546
EDWIN H. GOTT	WXQ4511	Chicago	0	0	0	11	2	1	1	0	4	0	0	0	19
JAMES R. BARKER	WYP8657	Chicago	1	0	0	52	19	13	14	46	47	70	75	63	400
MESABI MINER	WYQ4356	Chicago	3	0	0	0	1	1	4	0	0	33	18	10	70
PAUL R. TREGURTHA	WYR4481	Chicago	0	0	0	9	15	23	75	51	51	52	56	52	384
JOHN J. BOLAND	WZE4539	Chicago	0	0	0	0	0	0	0	0	8	4	0	0	12
PRESQUE ISLE	WZE4928	Chicago	0	0	0	1	5	24	87	123	64	57	42	45	448
EARL W. OGLEBAY	WZE7718	Chicago	0	0	0	0	0	0	0	0	2	1	0	0	3
ROGER BLOUGH	WZP8164	Chicago	0	0	0	33	25	11	23	41	10	34	61	40	278
Chicago Ships: 35	Totals:		101	6	30	209	344	359	533	606	521	610	717	426	4462

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
NOAA SHIP KA'IMIMOANA	WTEU	Honolulu	69	44	16	70	31	68	83	51	82	52	80	45	691
Honolulu Ships: 1	Totals:		69	44	16	70	31	68	83	51	82	52	80	45	691

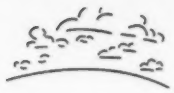
Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EASTERN EXPRESS	3FDN7	Houston	0	0	0	0	18	71	48	38	30	31	39	29	304
DEEPWATER MILLENNIUM	3FJA9	Houston	27	16	14	15	16	21	1	0	0	0	0	0	110
DEEPWATER HORIZON	H3SM	Houston	0	0	0	0	0	0	0	18	46	51	27	44	186
SARGASSO	H9YR	Houston	0	0	0	0	0	0	0	3	0	0	0	0	3
SAUDI DIRIYAH	HZZB	Houston	0	0	30	44	14	120	6	54	27	49	34	33	411
SAUDI HOFUF	HZZC	Houston	25	22	50	37	39	14	39	46	1	63	54	35	425
SAUDI TABUK	HZZD	Houston	0	0	0	0	1	0	0	71	23	38	50	74	257
CAPE VINCENT	KAES	Houston	0	0	0	3	37	0	0	0	0	1	0	0	41
CHEMICAL PIONEER	KAFO	Houston	21	39	34	26	30	12	12	0	0	0	29	38	241
ROVER	KCBH	Houston	18	6	0	19	18	45	35	29	38	9	0	8	225
COURIER	KCBK	Houston	5	49	0	0	6	3	42	59	9	4	0	0	177
GUS W. DARNELL	KCDK	Houston	27	0	15	0	0	0	30	23	3	1	15	20	134
CLEVELAND	KGXA	Houston	17	38	37	30	56	59	61	61	51	42	71	41	564
SEALAND DEVELOPER	KHRH	Houston	63	64	58	22	28	70	91	53	37	27	73	15	601
CHEMICAL EXPLORER	KRGC	Houston	0	1	0	0	0	0	0	0	0	0	0	12	13
SEALAND FLORIDA	KRHX	Houston	37	51	73	28	0	40	65	83	45	53	86	71	632

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LIBERTY WAVE	KRHZ	Houston	0	12	1	0	0	0	28	0	0	18	20	14	93
SEALAND ATLANTIC	KRLZ	Houston	35	50	39	51	34	70	52	11	0	31	98	44	515
SEALAND QUALITY	KRNJ	Houston	60	42	69	47	23	27	9	49	31	25	49	34	465
SEALAND COMMITMENT	KRPB	Houston	88	55	76	63	69	127	156	64	55	3	54	52	862
SEALAND PERFORMANCE	KRPD	Houston	38	46	45	52	62	68	43	26	29	36	48	48	541
NOBEL STAR	KRPP	Houston	32	36	32	17	25	0	0	10	19	17	32	35	255
CYNTHIA FAGAN	KSDF	Houston	41	31	1	0	0	47	7	27	59	12	0	27	252
TEXAS CLIPPER II	KVWA	Houston	0	0	0	0	4	13	16	1	0	1	0	0	35
STAR ISTIND	LAMP5	Houston	51	43	37	33	51	57	26	29	0	47	58	54	486
STAR FLORIDA	LAVW4	Houston	61	14	38	39	9	18	29	11	21	25	7	0	272
STAR FRASER	LAVY4	Houston	5	0	4	38	0	20	19	53	0	34	43	25	241
RHAPSODY OF THE SEAS	LAZK4	Houston	0	0	0	0	0	22	43	23	3	3	8	19	121
USNS MARY SEARS (T-AGS 6	NRFR	Houston	0	0	0	0	0	38	36	56	61	35	33	0	259
PACIFIC EXPLORER	V7DN3	Houston	0	0	42	87	93	56	64	55	0	31	55	46	529
NUEVO LEON	VQHV6	Houston	0	0	0	0	0	0	16	33	4	0	34	57	144
LYKES CHALLENGER	VSRL8	Houston	0	0	0	0	51	18	8	0	10	11	0	0	98
LYKES AMBASSADOR	VSRL9	Houston	21	10	9	12	9	6	8	10	13	4	4	6	112
TMM CAMPECHE	VSXC9	Houston	35	30	17	16	14	26	22	10	4	16	13	11	214
SEALAND MOTIVATOR	WAAH	Houston	85	67	22	68	50	81	54	112	75	53	79	73	819
LYKES MOTIVATOR	WABU	Houston	31	38	49	34	20	39	57	53	42	19	73	17	472
SEALAND PRIDE	WDA3673	Houston	56	51	66	63	60	71	113	98	81	51	39	77	826
OVERSEAS NEW ORLEANS	WFKW	Houston	26	32	46	33	29	39	42	37	35	34	28	20	401
OVERSEAS MARILYN	WFQB	Houston	0	0	0	0	0	0	0	0	7	13	23	12	55
OVERSEAS PHILADELPHIA	WGDB	Houston	0	0	0	0	0	0	0	3	4	3	7	1	18
LYKES EXPLORER	WGLA	Houston	47	24	72	62	38	62	42	104	55	38	50	50	644
LYKES NAVIGATOR	WGMJ	Houston	48	50	23	41	49	95	106	76	40	63	142	40	773
LYKES LIBERATOR	WGXN	Houston	33	57	48	35	61	74	42	97	60	56	42	39	644
LYKES DISCOVERER	WGXO	Houston	165	102	165	147	126	121	213	234	167	64	93	67	1664
SEALAND ACHIEVER	WPKD	Houston	43	39	56	25	34	32	87	58	69	47	63	46	599
SEALAND INTEGRITY	WPVD	Houston	136	83	125	160	142	52	60	1 54	146	129	174	190	1551
OVERSEAS HARRIETTE	WRFJ	Houston	45	36	6	18	16	13	34	46	44	19	11	15	303
MAERSK CONSTELLATION	WRYJ	Houston	28	10	0	0	0	0	21	33	5	20	16	4	137
CAPE TEXAS	WSDG	Houston	0	0	4	3	0	0	0	0	0	1	0	0	8
BUFFALO SOLDIER	WWXB	Houston	9	24	4	0	0	0	0	0	0	0	0	0	37
HUMBER ARM	ZCBQ2	Houston	0	0	0	0	0	0	0	0	0	9	52	29	90
SKANDERBORG	ZCIG4	Houston	0	0	0	0	0	0	0	38	39	35	13	22	147
SCHACKENBORG	ZCIH7	Houston	0	0	0	0	0	0	0	0	0	0	55	47	102
LYKES RANGER	ZIYE7	Houston	0	0	0	0	30	55	49	56	42	36	52	19	339
Houston Ships: 54		Totals:	1459	1268	1407	1368	1362	1802	1932	2205	1530	1408	2046	1660	19447

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CARNIVAL GLORY	3FPS9	Jacksonville	0	0	0	0	0	0	0	0	0	0	28	36	64
MAERSK TAIYO	9VJO	Jacksonville	0	0	25	46	56	0	0	0	19	11	0	0	157
DISNEY MAGIC	C6PT7	Jacksonville	0	0	0	0	0	0	0	0	0	0	3	0	3
HUAL TRANSPORTER	C6QO3	Jacksonville	0	0	0	0	0	0	0	0	3	0	0	0	3
SEALAND ARGENTINA	DGVN	Jacksonville	27	3	48	1	39	59	86	60	0	27	42	20	412
SOLAR WING	ELJS7	Jacksonville	98	22	97	82	89	93	105	99	86	82	91	103	1047
FRONTIER ACE	H3CM	Jacksonville	0	0	0	0	0	0	0	30	0	2	20	0	52
CARNIVAL FANTASY	H3GS	Jacksonville	0	0	0	0	9	6	1	0	0	0	0	0	16
HARMONY ACE	H3QA	Jacksonville	24	18	35	73	38	44	28	22	16	26	41	58	423
LTC CALVIN P. TITUS	KJLV	Jacksonville	0	0	0	0	0	0	0	0	0	62	170	31	263
STAR EVVIVA	LAHE2	Jacksonville	24	0	18	0	0	0	0	0	0	0	2	8	52
TALISMAN	LAOW5	Jacksonville	17	6	0	28	20	0	0	0	0	11	0	34	116
STAR AMERICA	LAVV4	Jacksonville	38	0	24	30	23	44	29	38	27	1	41	20	315
STAR HANSA	LAXP4	Jacksonville	24	0	6	7	4	1	15	1	1	0	0	7	66
1ST LT HARRY L. MARTIN	NDFH	Jacksonville	13	0	0	0	0	0	0	0	0	9	18	48	88
GREEN DALE	WCZ5238	Jacksonville	14	19	43	7	6	30	35	44	25	41	17	31	312

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
KILO MOANA	WDA7827	Jacksonville	0	0	0	79	97	38	64	40	38	53	38	0	447
EL YUNQUE	WGJT	Jacksonville	6	7	10	28	20	7	11	7	10	34	38	18	196
1ST LT BALDOMERO LOPEZ	WJKV	Jacksonville	0	0	0	0	0	0	0	0	2	0	0	0	2
RICHARD G MATTHIESEN	WLBV	Jacksonville	10	0	0	0	0	0	0	0	0	0	0	0	10
HORIZON EXPEDITION	WPGJ	Jacksonville	59	49	85	82	43	49	64	0	0	1	0	0	432
NOAA SHIP OSCAR ELTON SE	WTEE	Jacksonville	0	0	0	0	0	0	0	0	0	44	0	0	44
OVERSEAS JOYCE	WUQL	Jacksonville	16	24	21	9	11	19	19	19	22	22	9	17	208
HORIZON CHALLENGER	WZJC	Jacksonville	21	8	46	53	54	66	52	102	107	76	56	38	679
HORIZON DISCOVERY	WZJD	Jacksonville	0	0	0	53	55	56	51	70	68	56	47	48	504
HORIZON CRUSADER	WZJF	Jacksonville	0	0	0	0	0	0	0	0	0	69	63	51	183
Jacksonville Ships: 26	Totals:		391	156	458	578	564	512	560	532	424	627	724	568	6094

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SPIRIT OF OCEANUS	C6PJ8	Kodiak	0	0	0	0	0	4	5	0	0	0	0	0	9
ATLANTIS	KAQP	Kodiak	0	0	2	4	0	0	0	0	0	3	5	3	17
OVERSEAS CHICAGO	KBCF	Kodiak	0	1	0	0	0	0	0	0	0	0	28	45	74
TONSINA	KJDG	Kodiak	24	19	23	8	22	20	16	2	2	4	8	19	167
COIN OF THE REALM	KL0YL	Kodiak	0	0	20	28	26	38	32	10	0	4	71	40	269
OVERSEAS BOSTON	KRDB	Kodiak	16	8	0	0	0	0	23	32	11	2	0	0	92
RED DOG	KYU625	Kodiak	0	0	0	0	0	0	0	20	0	0	0	0	20
USCGC JARVIS	NAQD	Kodiak	0	0	0	1	0	0	0	0	0	0	0	0	1
USCGC SPAR	NJAR	Kodiak	0	0	0	1	0	0	1	0	0	0	0	0	2
USCGC RUSH	NLVS	Kodiak	0	0	0	0	0	14	39	34	0	0	0	0	87
USCGC HAMILTON WHEC	715 NMAG	Kodiak	0	0	0	0	0	0	0	0	0	0	0	1	1
USCGC ACUSHNET WMEC 167	NNHA	Kodiak	2	0	0	12	1	3	0	0	0	0	2	0	20
USCGC FIREBUSH WLB 393	NODL	Kodiak	0	0	1	0	0	0	0	0	0	0	0	0	1
USCGC STORIS (WMEC 38)	NRUC	Kodiak	0	0	20	1	13	25	72	7	0	0	0	0	138
USCGC ALEX HALEY	NZPO	Kodiak	0	1	0	0	0	0	0	0	0	2	0	0	3
LNG GEMINI	V7BW9	Kodiak	17	3	0	0	0	0	0	0	0	25	71	23	139
OCEAN RELIANCE	WADY	Kodiak	0	0	0	0	0	0	0	0	0	2	3	4	9
COASTAL RELIANCE	WADZ	Kodiak	0	0	0	0	0	0	0	0	0	3	4	6	13
NORTHERN SPIRIT	WAQ2746	Kodiak	10	14	20	17	34	43	55	55	63	24	65	30	430
VIKING STAR	WAS4138	Kodiak	8	3	0	1	4	0	0	0	3	2	0	4	25
TITAN	WAW9232	Kodiak	14	7	0	0	0	0	1	8	17	10	11	14	82
NATOMA	WBB5799	Kodiak	5	0	0	6	0	0	0	4	0	3	8	6	32
BLARNEY	WBP4766	Kodiak	1	4	1	1	23	23	19	2	21	62	2	2	161
COASTAL PILOT	WBP7281	Kodiak	2	0	6	0	0	0	0	0	0	0	0	0	8
RESOLUTION	WBR6941	Kodiak	0	0	0	1	0	1	0	0	0	0	0	0	2
DAVID BRUSCO	WBT4608	Kodiak	0	0	0	0	0	2	0	0	0	0	0	0	2
ZENITH	WBV3237	Kodiak	1	0	1	0	1	4	0	1	1	1	1	2	13
SAMSON MARINER	WCN3586	Kodiak	13	3	2	4	6	5	11	1	5	1	0	19	70
PACIFIC PRIDE	WCN4995	Kodiak	0	0	0	0	0	0	0	0	0	0	0	1	1
MICHAEL O'LEARY	WCP9556	Kodiak	0	0	0	0	0	0	0	1	2	0	0	0	3
NAVAJO	WCT5737	Kodiak	0	0	11	2	0	10	9	0	1	2	2	1	38
GYR FALCON	WCU6587	Kodiak	2	0	0	0	0	1	0	0	3	0	0	0	6
JEFFREY FOSS	WCX4608	Kodiak	0	0	0	0	0	0	4	0	1	20	2	0	27
STIMSON	WCY2270	Kodiak	0	0	20	19	34	16	9	0	6	60	41	0	205
WOLDSTAD	WCY2271	Kodiak	0	0	24	37	15	41	8	0	0	29	0	0	154
CHINOOK	WCY2791	Kodiak	0	0	0	0	0	0	0	4	0	0	0	2	6
GRETA	WCY2853	Kodiak	0	0	0	0	23	4	0	10	22	31	1	0	91
KENNICOTT	WCY2920	Kodiak	24	32	49	52	50	13	51	91	59	45	1	0	467
COASTAL EXPLORER	WCY3172	Kodiak	0	0	0	5	1	17	16	7	6	1	7	6	66
DAVIDSON	WCY3880	Kodiak	0	0	0	0	0	0	0	72	26	0	0	0	98
IVER FOSS	WCY6442	Kodiak	0	0	0	0	0	2	0	0	0	4	0	9	15
SEABULK PRIDE	WCY7052	Kodiak	0	0	37	64	45	41	82	23	45	28	32	44	441
SEABULK ARCTIC	WCY7054	Kodiak	0	0	0	0	0	0	11	3	5	22	45	30	116
JOHN BRIX	WCY7560	Kodiak	0	0	0	0	0	0	0	0	0	0	19	8	27



Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
BOUCHARD BOYS	WCY7761	Kodiak	0	0	0	0	0	0	0	0	0	0	3	26	29
PACIFIC AVENGER	WCY8175	Kodiak	0	0	0	0	0	0	0	0	0	0	0	5	5
MAUNA LOA	WCY8398	Kodiak	0	0	0	0	0	0	0	0	0	9	0	0	9
SEABULK COURAGE	WCY8453	Kodiak	0	0	0	0	0	0	0	0	0	0	0	12	12
TRIDENT	WCZ2913	Kodiak	0	2	5	8	9	2	8	5	11	1	5	0	56
NORTHERN VICTOR	WCZ6534	Kodiak	6	0	0	15	0	6	0	0	0	5	0	0	32
M/V NORTHWEST EXPLORER	WCZ9007	Kodiak	0	0	0	0	0	0	4	0	0	0	0	0	4
PARAGON	WDA2311	Kodiak	25	40	32	0	1	9	51	41	64	66	95	51	0	484
SEA HAWK	WDA3282	Kodiak	0	0	0	0	0	0	0	0	0	0	0	2	2
PACIFIC CHALLENGER	WDA3588	Kodiak	0	0	0	0	5	19	13	42	56	104	36	1	276
PHYLLIS DUNLAP	WDA6552	Kodiak	0	9	3	2	11	5	3	2	2	8	4	0	49
LAUREN FOSS	WDB3834	Kodiak	0	0	0	0	0	0	60	37	0	3	1	0	101
CORBIN FOSS	WDB5265	Kodiak	0	0	0	0	0	0	0	0	0	0	22	0	22
PACIFIC FREEDOM	WDJF	Kodiak	0	0	5	9	0	0	15	25	22	3	0	0	79
SEA RELIANCE	WEOB	Kodiak	0	0	0	0	0	0	0	0	0	10	18	12	40
TAKU	WI9491	Kodiak	20	10	5	0	10	3	1	0	0	0	0	26	75
OVERSEAS NEW YORK	WMCK	Kodiak	2	0	0	0	0	0	0	0	0	0	0	5	7
MATANUSKA	WN4201	Kodiak	0	1	22	1	0	31	49	75	0	7	0	0	186
TUSTUMENA	WNGW	Kodiak	0	0	0	9	27	109	109	80	121	90	43	49	637
BLUEFIN	WQZ9646	Kodiak	0	0	0	1	0	2	3	0	5	2	0	0	13
FISHHAWK	WRB5085	Kodiak	0	0	0	0	0	0	0	6	10	8	0	0	24
R.V. DAY	WS6709	Kodiak	0	0	0	0	2	0	1	0	0	0	0	0	3
ALPHA HELIX	WSD7078	Kodiak	0	0	7	9	11	4	14	14	8	4	0	0	71
COASTAL TRADER	WSL8560	Kodiak	0	4	0	0	1	1	0	1	0	0	1	0	8
KENAI	WSNB	Kodiak	7	0	0	0	0	0	3	6	0	0	1	0	17
BOWFIN	WSX7318	Kodiak	0	0	1	0	2	0	0	2	1	4	0	0	10
LOIS H.	WTD4576	Kodiak	0	0	0	0	0	0	1	0	1	0	0	0	2
YELLOWFIN	WTE8342	Kodiak	0	0	0	0	0	0	0	1	0	0	0	0	1
REDFIN	WTP2735	Kodiak	2	0	0	1	2	1	0	0	2	1	0	0	9
CAPT LES EASON	WTT8587	Kodiak	0	0	2	4	0	0	4	2	0	0	2	0	14
MIKI HANA	WTW9252	Kodiak	0	0	1	4	0	0	12	0	0	0	15	1	33
HENRY SAUSE	WTW9259	Kodiak	0	0	1	4	0	0	6	1	0	1	1	0	14
ROUGHNECK	WTW9262	Kodiak	0	0	2	6	10	3	15	3	7	12	0	1	59
OCEAN SERVICE	WTW9263	Kodiak	7	5	0	6	7	10	12	0	0	0	0	0	47
ROBERT L.	WTW9264	Kodiak	0	4	7	0	0	2	1	3	0	6	2	0	25
MIKI MIKI	WTW9266	Kodiak	0	0	0	0	0	0	0	0	0	0	0	6	6
POWHATTAN	WTX7883	Kodiak	0	0	0	0	2	3	2	0	4	0	0	0	11
AMERICAN NO. 1	WTY8664	Kodiak	0	0	0	0	1	0	0	0	0	0	0	0	1
DIANE H.	WUR7250	Kodiak	0	0	0	1	18	5	42	12	1	8	8	0	95
SALISHAN	WUT4384	Kodiak	0	2	11	11	7	0	2	0	0	0	0	0	33
SOUND RELIANCE	WXAE	Kodiak	0	0	0	0	0	0	0	0	0	1	17	6	24
E.L. BARTLETT	WY6244	Kodiak	1	0	0	0	6	18	55	18	33	0	0	0	131
EDITH OLSON	WY8838	Kodiak	0	0	0	0	0	0	0	0	0	1	0	0	1
MALOLO	WYH6327	Kodiak	56	19	21	42	60	125	141	142	131	72	8	11	828
TAURUS	WYH6499	Kodiak	0	0	0	0	0	2	46	11	0	0	0	0	59
SANDRA FOSS	WYL4908	Kodiak	0	0	20	20	26	9	0	0	1	17	1	0	94
STACEY FOSS	WYL4909	Kodiak	0	0	0	0	0	9	0	0	0	13	0	0	22
JUSTINE FOSS	WYL4978	Kodiak	14	15	14	13	3	4	7	7	2	10	5	4	98
SIDNEY FOSS	WYL5445	Kodiak	0	5	2	25	14	6	30	7	15	32	0	0	136
NORMA H.	WYL6686	Kodiak	0	0	0	0	0	0	0	0	6	0	0	0	6
AURORA	WYM9567	Kodiak	0	0	0	0	0	10	6	0	3	31	0	0	50
NORCOASTER	WYP7276	Kodiak	0	0	0	0	0	0	1	0	2	1	1	0	5
COLUMBIA	WYR2092	Kodiak	0	0	0	0	3	11	1	7	1	0	0	0	23
AGNES FOSS	WYZ3112	Kodiak	5	1	4	17	9	7	13	13	30	18	0	13	130
LECONTE	WZE4270	Kodiak	23	0	0	1	1	1	0	0	0	0	0	0	26
Kodiak Ships: 99		Totals:	307	212	402	473	564	786	1185	973	840	967	674	499	7882

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EVER ROYAL	3FGI3	Long Beach	0	0	0	0	6	1	0	0	0	0	0	0	7
EVER ROUND	3FQN3	Long Beach	10	0	0	0	0	0	0	0	0	0	0	0	10
TAI HE	BOAB	Long Beach	35	9	0	0	0	0	0	0	0	0	0	0	44
CALIFORNIA JUPITER	ELKU8	Long Beach	23	38	7	0	0	0	0	0	0	0	0	0	68
P&O NEDLLOYD YANTIAN	ELYD5	Long Beach	28	0	0	0	18	21	45	57	62	68	60	47	406
SEALAND EXPRESS	KGJD	Long Beach	0	0	0	0	0	0	32	25	0	0	0	0	57
SEALAND VOYAGER	KHRK	Long Beach	13	55	62	49	47	72	82	55	80	64	75	78	732
PRUDHOE BAY	KPFD	Long Beach	1	0	0	0	0	0	0	0	0	0	0	0	1
STAR GRAN	LADR4	Long Beach	23	6	6	0	0	15	37	10	37	29	0	4	167
MATHILDE MAERSK	OUUU2	Long Beach	16	13	8	3	24	28	10	25	25	30	0	0	182
MARCHEN MAERSK	OWDQ2	Long Beach	29	24	27	13	32	21	0	0	0	0	0	0	146
MAREN MAERSK	OWZU2	Long Beach	22	31	26	29	18	14	19	28	22	15	17	15	256
METTE MAERSK	OXKT2	Long Beach	29	26	25	25	50	55	53	50	36	43	36	35	463
DIRCH MAERSK	OXQP2	Long Beach	66	21	139	24	23	39	22	38	12	40	15	58	497
MARGRETHE MAERSK	OYSN2	Long Beach	31	35	28	8	20	9	39	17	28	8	21	17	261
TAUSALA SAMOA	V2FA2	Long Beach	0	0	1	1	0	0	0	0	0	0	0	0	2
MAERSK DUBLIN	V2PW3	Long Beach	18	26	22	24	21	20	2	0	0	0	0	0	133
SEALAND METEOR	V7AP7	Long Beach	75	49	60	51	40	55	39	27	16	4	0	0	416
SEALAND EAGLE	V7AZ8	Long Beach	23	16	18	7	40	13	21	10	1	1	0	0	150
OOCL NETHERLANDS	VRVN6	Long Beach	27	27	22	50	29	16	26	21	2	0	11	1	232
OOCL FAIR	VRWB8	Long Beach	51	61	52	19	50	46	49	47	52	58	41	50	576
OOCL FIDELITY	VRWG5	Long Beach	38	19	30	35	24	0	1	2	13	0	5	0	167
HORIZON CONSUMER	WCHF	Long Beach	50	40	9	24	16	4	21	28	30	31	48	44	345
APL SINGAPORE	WCX8812	Long Beach	57	62	64	68	63	49	51	67	54	42	43	55	675
APL THAILAND	WCX8882	Long Beach	62	47	60	21	30	43	38	37	29	32	40	51	490
APL KOREA	WCX8883	Long Beach	31	43	46	37	23	25	26	37	46	58	67	34	473
APL PHILIPPINES	WCX8884	Long Beach	28	32	29	25	46	37	23	67	54	42	44	45	472
PRESIDENT GRANT	WCY2098	Long Beach	66	50	68	1	59	50	57	50	52	53	46	31	583
PRESIDENT WILSON	WCY3438	Long Beach	36	20	21	42	43	54	46	37	6	38	60	31	434
APL CHINA	WDB3161	Long Beach	0	0	0	29	33	52	57	46	38	44	48	37	384
MELVILLE	WECB	Long Beach	90	65	64	95	57	71	39	24	4	13	0	3	525
EWA	WEZM	Long Beach	10	27	43	34	16	22	35	20	17	43	61	65	393
HORIZON RELIANCE	WFLH	Long Beach	81	83	72	69	92	90	81	91	81	96	81	87	1004
NEW HORIZON	WKWB	Long Beach	0	48	30	0	0	13	31	49	62	52	52	5	342
POLAR CALIFORNIA	WMCV	Long Beach	39	25	41	15	18	3	14	5	0	1	0	8	169
HORIZON NAVIGATOR	WPGK	Long Beach	63	57	47	51	43	53	68	61	38	50	56	62	649
R.J. PFEIFFER	WRJP	Long Beach	27	22	28	26	34	26	22	19	15	21	27	19	286
MAUI	WSLH	Long Beach	40	35	32	47	49	25	36	52	39	48	66	67	536
KAUAI	WSRH	Long Beach	61	55	61	58	59	45	66	47	40	15	21	37	565
HORIZON PACIFIC	WSRL	Long Beach	54	30	44	55	62	68	70	72	73	62	69	49	708
DENALI	WSVR	Long Beach	36	22	15	17	29	8	25	22	13	21	18	23	249
NOAA DAVID STARR JORDAN	WTDK	Long Beach	0	2	0	0	0	0	0	0	18	0	0	0	20
Long Beach Ships: 42	Totals:		1389	1221	1307	1052	1214	1163	1283	1243	1095	1122	1128	1058	14275

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CARNIVAL VICTORY	3FFL8	Miami	24	26	60	17	11	14	9	3	3	10	10	18	205
CARIBBEAN MERCY	3FFU4	Miami	13	0	0	6	0	0	11	0	0	0	1	8	39
CARNIVAL PARADISE	3FOB5	Miami	0	1	0	2	0	28	29	12	18	26	23	23	162
CARNIVAL SPIRIT	3FPR9	Miami	0	3	0	0	0	0	0	0	0	0	5	0	8
FASCINATION	C6FM9	Miami	9	7	9	5	6	0	4	3	4	0	0	0	47
CARNIVAL TRIUMPH	C6FN5	Miami	27	30	38	38	39	34	15	1	2	0	0	0	224
NAVIGATOR OF THE SEAS	C6FU4	Miami	0	0	0	0	0	0	0	0	0	51	51	38	140
DUNCAN ISLAND	C6JS	Miami	67	51	47	44	51	39	39	30	47	27	32	46	520
CHARLES ISLAND	C6JT	Miami	38	31	4	3	2	1	0	2	1	1	9	10	102
HOOD ISLAND	C6LU4	Miami	0	0	6	29	29	23	17	50	50	43	44	43	334
BARRINGTON ISLAND	C6QK	Miami	37	14	14	20	21	17	13	5	8	7	19	39	214
CELTIC SEA	C6RT	Miami	0	0	0	45	37	49	36	45	65	39	46	57	419

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
VOYAGER OF THE SEAS	C6SE5	Miami	0	0	0	0	0	0	0	0	0	7	12	2	21
EXPLORER OF THE SEAS	ELWX5	Miami	36	388	430	360	439	414	335	255	365	337	125	30	3514
CARNIVAL PRIDE	H3VU	Miami	0	0	2	0	0	4	16	18	2	1	0	0	43
TROPIC LURE	J8PD	Miami	1	0	1	0	0	0	0	0	0	0	0	0	2
ARIZONA VOYAGER	KGBE	Miami	0	5	0	0	9	21	23	6	4	0	0	0	68
MARIT MAERSK	OZFC2	Miami	23	2	8	15	32	6	28	0	8	15	6	0	143
MAASDAM	PFRO	Miami	46	30	3	5	3	0	0	0	3	46	14	0	150
STATENDAM	PHSG	Miami	0	0	0	0	0	0	0	0	0	0	0	13	13
MEKONG PIONEER	V2JN	Miami	83	76	85	73	71	38	47	76	86	43	84	94	856
ITB NEW YORK	WVDG	Miami	0	5	22	15	5	0	2	25	15	5	0	4	98
CHIQUITA BREMEN	ZCBC5	Miami	0	0	0	15	23	20	36	11	42	49	35	28	259
Miami Ships: 23		Totals:	404	669	729	692	778	708	660	542	723	707	516	453	7581

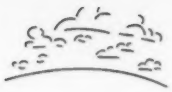
Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MACKINAC BRIDGE	JKES	Newark	0	31	24	49	28	56	44	44	42	46	55	58	477
OLUF MAERSK	OXFU2	Newark	0	0	0	0	0	0	0	0	0	45	17	38	100
OLEANDER	PJJU	Newark	9	0	0	0	0	1	0	0	2	0	0	0	12
Newark Ships: 3		Totals:	9	31	24	49	28	57	44	44	44	91	72	96	589

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CARNIVAL CONQUEST	3FPQ9	New Orleans	0	1	5	12	10	8	9	5	9	14	11	13	97
DISCOVERER ENTERPRISE	3FZQ7	New Orleans	13	3	2	2	0	0	16	23	21	16	21	4	121
ZIM ITALIA	4XGT	New Orleans	38	0	13	36	0	0	1	12	0	0	48	0	148
MT VIRGO VOYAGER	C6FG8	New Orleans	53	15	17	53	37	17	11	5	16	13	9	9	255
CHARLES B. RENFREW	C6JP	New Orleans	0	0	0	0	32	17	10	0	0	0	0	0	59
BERNARDO QUINTANA A	C6KJ5	New Orleans	70	64	36	50	68	115	56	62	62	77	63	72	795
CELEBRATION	H3GQ	New Orleans	3	0	0	0	1	33	18	12	8	6	23	18	122
DISCOVERER DEEP SEAS	HP9685	New Orleans	20	23	15	34	35	44	56	57	46	47	31	42	450
ROGER REVELLE	KAOU	New Orleans	47	24	5	7	1	41	38	49	61	82	57	57	469
CAPT STEVEN L BENNETT	KAXO	New Orleans	92	109	100	36	46	75	0	47	55	0	4	0	564
JUDY LITRICO	KCKB	New Orleans	79	37	9	4	40	3	48	39	21	54	33	14	381
LIBERTY SEA	KPZH	New Orleans	41	0	0	41	0	0	14	21	14	15	12	21	179
POLAR DISCOVERY	WACW	New Orleans	0	0	0	0	0	0	0	0	0	0	3	2	5
LIBERTY GRACE	WADN	New Orleans	9	0	0	0	1	0	0	0	27	0	0	0	37
POLAR ENDEAVOUR	WCAJ	New Orleans	9	12	18	11	16	14	11	20	27	15	10	21	184
LIBERTY STAR	WCBP	New Orleans	58	26	68	67	66	55	13	54	0	2	0	0	409
LIBERTY SUN	WCOB	New Orleans	46	29	54	17	20	55	21	29	26	20	61	1	379
LIBERTY SPIRIT	WCPU	New Orleans	0	49	61	13	28	18	20	16	27	34	39	16	321
SHEILA MCDEVITT	WDA4069	New Orleans	0	0	0	0	0	0	0	0	0	0	0	38	38
ATLANTIC FOREST	WDB2122	New Orleans	0	0	0	0	0	0	0	0	0	31	10	41	82
M/T MONTAUK	WDCJ	New Orleans	29	10	31	16	17	35	32	53	46	33	20	3	325
POLAR RESOLUTION	WDJK	New Orleans	21	20	12	20	25	18	28	25	30	76	59	30	364
WILSON	WNPD	New Orleans	0	0	0	0	0	0	0	0	0	0	52	44	96
NOAA SHIP OREGON II	WTDO	New Orleans	101	84	0	0	121	66	82	125	105	119	58	0	861
NOAA SHIP RONALD H BROWN	WTEC	New Orleans	0	22	57	0	0	79	98	59	41	50	79	0	485
NOAAS GORDON GUNTER	WTEO	New Orleans	0	0	0	0	0	82	136	149	157	143	114	0	781
New Orleans Ships: 26		Totals:	729	528	503	419	564	775	718	862	799	847	817	446	8007

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EVER DEVELOP	3FLF8	New York City	0	0	0	3	-2	0	4	0	0	0	0	0	9
EVER DIADEM	3FOF8	New York City	10	7	9	5	0	0	0	0	0	0	0	0	31
EVER REACH	3FQO4	New York City	53	1 2	38	14	31	0	19	0	0	17	4	0	188
EVER DYNAMIC	3FUB8	New York City	6	4	8	0	0	0	0	0	0	0	0	0	18

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ZIM ASIA	4XFB	New York City	25	23	30	35	13	17	60	44	0	0	25	19	291
ZIM AMERICA	4XGR	New York City	48	0	0	15	4	2	46	1	0	0	16	36	168
ALBEMARLE ISLAND	C6LU3	New York City	69	70	148	77	58	32	61	48	49	36	53	38	739
ARCTIC OCEAN	C6T2062	New York City	0	0	1	0	0	0	0	0	1	0	0	0	2
INDIAN OCEAN	C6T2063	New York City	18	20	21	13	29	52	28	18	31	34	36	11	311
ATLANTIC OCEAN	C6T2064	New York City	60	79	59	57	37	27	45	28	43	23	12	45	515
ARGONAUT	KFDV	New York City	18	2	1	0	0	0	0	22	0	0	0	21	64
HORIZON HAWAII	KIRF	New York City	34	61	64	70	71	69	57	61	112	79	70	82	830
EMPIRE STATE	KKFW	New York City	31	8	0	0	22	14	24	0	0	0	0	0	99
ITB GROTON	KMJL	New York City	40	27	15	21	28	52	33	27	42	45	61	38	429
NOAA SHIP DELAWARE II	KNBD	New York City	70	91	117	115	95	0	139	143	110	6	27	0	913
MAJESTIC MAERSK	OUJH2	New York City	18	21	20	47	7	27	19	26	38	22	39	42	326
MARIE MAERSK	OULL2	New York City	24	13	46	24	33	43	0	57	0	51	0	11	302
MUNKEBO MAERSK	OUNI5	New York City	19	12	31	19	19	23	8	37	0	1	0	0	169
MAGLEBY MAERSK	OUSH2	New York City	0	7	13	20	6	22	2	42	15	1	0	5	133
JOHANNES MAERSK	OWFD2	New York City	0	0	0	0	0	0	0	0	77	15	9	42	143
KNUD MAERSK	OYBJ2	New York City	0	0	58	1	0	0	0	0	0	1	0	0	60
ENDURANCE	WAUU	New York City	40	27	29	40	31	29	39	59	32	19	27	35	407
ENDEAVOR	WAUW	New York City	34	31	55	1	55	38	52	27	33	48	27	41	442
ENTERPRISE	WAUY	New York City	15	0	27	0	0	129	4	23	42	69	28	17	354
GREEN POINT	WCY4148	New York City	54	42	33	30	38	11	53	8	13	9	15	52	358
HORIZON PRODUCER	WJBJ	New York City	70	69	83	80	76	67	73	67	53	61	80	55	834
MAURICE EWING	WLDZ	New York City	0	0	0	50	42	70	49	57	39	56	21	0	384
MANUKAI	WRGD	New York City	0	0	0	0	0	0	0	0	0	9	45	46	100
New York CityShips: 27	Totals:		756	626	906	737	697	724	815	795	730	602	595	636	8619

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
APL ALMANDINE	9VBS	Norfolk	0	0	0	0	0	0	0	8	36	28	6	0	78
SEALAND INTREPID	9VWZ	Norfolk	0	0	0	49	11	42	18	50	17	31	14	19	251
P&O NEDLLOYD DAMMAM	A8CA3	Norfolk	0	0	0	0	0	0	50	78	67	87	57	65	404
JOIDES RESOLUTION	D5BC	Norfolk	5	1	0	0	0	6	0	0	29	0	1	40	82
CONTI MALACA	DGVZ	Norfolk	0	0	13	25	18	0	41	50	27	20	51	42	287
SEA MERCHANT	ELQN2	Norfolk	7	50	1	0	0	0	0	0	0	0	0	0	58
MOSEL ORE	ELRE5	Norfolk	62	56	11	12	22	3	55	13	0	0	11	22	267
DIRECT TUI	ELVZ5	Norfolk	58	64	37	40	66	32	87	59	78	92	71	64	748
CONTSHIP ROME	ELVZ6	Norfolk	31	18	43	36	27	30	0	35	37	17	42	42	358
EDWARD OLDENDORFF	ELWP2	Norfolk	0	33	0	28	0	0	0	0	0	0	0	0	61
CAP SAN ANTONIO	ELZU6	Norfolk	0	0	0	0	0	0	0	0	0	45	55	18	118
STAR GEIRANGER	LAKQ5	Norfolk	34	20	22	25	13	8	28	20	4	26	26	0	226
STAR GRINDANGER	LAKR5	Norfolk	85	5	44	34	35	0	31	32	0	38	30	1	335
TAMESIS	LAOL5	Norfolk	34	3	20	0	24	18	0	0	12	28	4	2	145
USNS GILLILAND		Norfolk	0	0	0	0	0	0	0	0	1	0	0	0	1
COLUMBUS CANADA	P3RD8	Norfolk	40	9	3	1	45	78	68	73	67	54	18	0	456
COLUMBUS VICTORIA	P3RF8	Norfolk	58	25	73	82	151	0	1	82	78	69	38	21	678
COSCO NORFOLK	P3ZY6	Norfolk	17	9	0	25	18	21	11	5	5	1	0	10	122
ATLANTIC CARTIER	SCKB	Norfolk	0	0	0	0	0	0	0	0	40	42	26	48	156
ORKUN KALKAVAN	TCCG6	Norfolk	0	0	0	0	7	0	0	19	22	20	17	22	107
LEYLA KALKAVAN	TCCJ7	Norfolk	0	0	0	32	18	0	0	0	0	1	0	0	51
ALKIN KALKAVAN	TCQP	Norfolk	0	0	0	0	0	0	0	0	0	6	23	0	29
SELMA KALKAVAN	TCSX	Norfolk	7	56	11	18	26	48	29	18	21	26	54	34	348
INDUSTRIAL CRESCENT	V2UD	Norfolk	0	0	0	1	0	0	0	0	0	0	0	0	1
SEALAND COMET	V7AP3	Norfolk	59	33	55	3	0	4	18	20	24	2	0	0	218
T/V STATE OF MAINE	WCAH	Norfolk	0	0	0	0	0	1	1	0	0	2	0	0	4
GEYSIR	WCZ5528	Norfolk	30	1	14	71	40	105	39	15	39	80	105	35	574
STRONG PATRIOT	WCZ8589	Norfolk	5	1	18	39	45	11	4	3	8	15	7	0	156
INDUSTRIAL CHALLENGER	WDHL	Norfolk	13	27	0	0	10	2	9	12	3	10	4	20	110
2ND LT. JOHN P. BOBO	WJKH	Norfolk	57	12	46	64	30	21	58	20	23	13	33	3	380



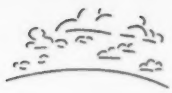
Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
DELAWARE BAY	WMLG	Norfolk	32	22	91	35	21	30	0	30	36	35	3	10	345
CHESAPEAKE BAY	WMLH	Norfolk	35	24	52	45	35	21	31	37	36	21	42	17	396
NOAA SHIP ALBATROSS IV	WMVF	Norfolk	0	0	0	0	0	0	19	57	68	66	49	0	259
ADVANTAGE	WPPO	Norfolk	9	7	36	0	17	28	9	8	53	1	13	0	181
NOAA SHIP THOMAS JEFFERS	WTEA	Norfolk	0	0	0	0	0	0	0	0	4	3	0	0	7
NOAA SHIP NANCY FOSTER	WTER	Norfolk	0	0	0	2	17	44	49	64	29	43	16	0	264
Norfolk Ships: 36	Totals:		678	476	590	667	696	553	656	808	864	922	816	535	8261

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	J un	Jul	Aug	Sep	Oct	Nov	Dec	Total
ALLIGATOR STRENGTH	3FAK5	Oakland	0	0	0	0	0	0	0	0	0	1	0	0	1
MOL BRAVERY	3FXX4	Oakland	0	0	4	0	0	0	0	0	0	0	0	0	4
MOL VIGOR	9VVN	Oakland	32	30	20	0	5	0	8	2	0	0	9	0	106
MOL INNOVATION	9VVP	Oakland	37	15	11	19	16	0	3	0	0	44	24	42	211
APL TURQUOISE	9VVY	Oakland	42	37	49	43	27	54	15	32	44	36	28	33	440
RICHARD H MATZKE	C6FE5	Oakland	13	5	25	44	61	50	12	30	60	11	45	49	405
FRANK A. SHRONTZ	C6PZ3	Oakland	27	38	117	53	37	9	5	45	39	60	37	0	467
J. BENNETT JOHNSTON	C6QE3	Oakland	2	5	0	0	11	6	0	0	0	0	1	0	25
DIRECT JABIRU	ELYJ9	Oakland	0	0	70	0	17	0	0	0	0	0	0	0	87
SETO BRIDGE	JMQY	Oakland	57	32	21	57	55	45	41	49	27	0	0	0	384
MANOA	KDBG	Oakland	30	34	26	36	44	60	39	35	43	66	46	32	491
WASHINGTON VOYAGER	KFDB	Oakland	0	1	4	8	0	19	0	3	17	2	17	0	71
SEA-LAND DEFENDER	KGJB	Oakland	46	30	50	51	49	52	57	57	36	65	74	50	617
MATSONIA	KHRC	Oakland	22	26	21	19	31	11	2	9	9	18	9	4	181
SEALAND PATRIOT	KHRF	Oakland	35	41	48	24	23	50	42	31	54	57	66	74	545
SEALAND LIBERATOR	KHRP	Oakland	45	50	40	41	51	46	54	64	41	49	49	55	585
CSX TRADER	KIRH	Oakland	27	15	33	36	36	45	32	42	27	64	39	38	434
COLORADO VOYAGER	KLHZ	Oakland	0	0	0	0	0	0	0	0	0	0	15	0	15
MARINE COLUMBIA	KLKZ	Oakland	72	66	68	61	47	116	72	48	48	59	71	77	805
MANULANI	KNIJ	Oakland	0	0	0	0	0	10	20	0	0	1	0	0	31
CSX ENTERPRISE	KRGB	Oakland	57	62	149	27	18	75	77	70	69	128	83	578	1393
STRONG VIRGINIAN	KSPH	Oakland	47	68	78	86	77	32	15	37	42	77	37	49	645
SEALAND MERCURY	MCDW9	Oakland	0	0	0	0	0	0	0	0	0	0	0	21	21
SEALAND CHAMPION	MCDZ2	Oakland	0	0	0	0	0	0	0	0	0	0	0	27	27
GOLDEN BEAR	NMRY	Oakland	0	0	0	13	75	62	87	41	0	2	0	0	280
MADISON MAERSK	OVJB2	Oakland	0	0	10	27	27	17	35	41	52	38	24	39	310
MAYVIEW MAERSK	OWEB2	Oakland	24	8	8	31	2	44	21	46	14	48	12	37	295
MAERSK DAMMAM	V2OE3	Oakland	0	0	0	0	0	0	0	0	0	0	45	24	69
OOCL HONG KONG	VRVA5	Oakland	21	20	5	14	8	39	32	48	33	36	28	44	328
MOKU PAHU	WBWK	Oakland	6	16	35	6	6	42	59	19	45	31	31	21	317
GREEN COVE	WCZ9380	Oakland	0	0	0	0	0	1	17	21	13	1	0	0	53
CHIEF GADAO	WEZD	Oakland	23	19	81	30	42	20	27	39	28	26	39	28	402
HORIZON SPIRIT	WFLG	Oakland	52	53	34	49	58	54	44	56	71	74	68	77	690
SEALAND INNOVATOR	WGKF	Oakland	52	53	47	33	66	50	50	56	59	62	35	76	639
MAHIMAHI	WHRN	Oakland	61	49	53	41	61	41	36	44	34	37	52	44	553
LURLINE	WLVD	Oakland	18	19	62	16	29	45	42	36	0	1	0	10	278
MOKIHANA	WNRD	Oakland	64	40	30	47	55	32	32	58	38	39	65	53	553
LIHUE	WTST	Oakland	67	60	249	48	61	94	78	57	56	18	16	13	817
Oakland Ships: 38	Totals:		979	892	1448	960	1095	1221	1054	1116	999	1151	1065	1595	13575

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ORIENTE HOPE	3ETH4	Seattle	0	0	0	0	0	0	0	0	0	2	0	0	2
CHANG JIANG BRIDGE	3EZJ9	Seattle	0	0	0	0	0	0	0	0	49	42	55	50	196
RUBIN ARTEMIS	3FAH7	Seattle	0	0	0	0	0	0	0	0	2	14	11	14	41
SEVEN SEAS	3FBS9	Seattle	0	0	0	0	0	0	0	0	8	0	0	0	8
EVER URANUS	3FCA9	Seattle	0	0	0	6	0	13	0	0	12	0	5	12	48

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LT UNITY	3FCD9	Seattle	0	0	0	0	0	0	0	0	0	1	0	0	1
GOLDEN NOVA	3FDV6	Seattle	9	21	32	0	0	0	5	0	0	2	25	20	114
EVER ULTRA	3FEJ6	Seattle	0	4	0	0	0	0	0	15	0	0	11	0	30
ARIES HARMONY	3FEY7	Seattle	0	7	12	3	6	0	3	2	4	1	0	0	38
KURE	3FGN3	Seattle	7	7	22	23	23	21	7	19	18	16	14	13	190
ORIENTE GRACE	3FHT4	Seattle	0	0	0	0	0	24	42	0	0	1	0	0	67
KEN KOKU	3FMN6	Seattle	0	0	8	5	0	0	0	0	0	0	0	0	13
BRIGHT STATE	3FMY7	Seattle	30	27	34	29	43	16	42	27	33	23	58	0	362
ORIENTE PRIME	3FOU4	Seattle	21	12	1	0	0	0	0	0	0	0	0	0	34
EVER GRADE	3FOW2	Seattle	0	0	0	0	0	0	0	0	0	15	8	19	42
BLUE GEMINI	3FPA6	Seattle	72	42	76	13	94	47	0	0	0	6	61	59	470
LEO FOREST	3FPH8	Seattle	0	0	1	0	0	0	0	0	0	0	0	0	1
DAISHIN MARU	3FPS6	Seattle	85	90	71	62	41	0	0	0	0	1	82	0	432
OLYMPIAN HIGHWAY	3FSH4	Seattle	1	27	65	81	95	92	98	25	0	28	22	6	540
ORIENTE VICTORIA	3FVG8	Seattle	29	15	0	0	0	0	0	0	0	0	0	0	44
KAIJIN	3FWI3	Seattle	0	0	0	0	0	0	0	0	0	4	0	0	4
EVER UNIQUE	3FXQ6	Seattle	10	0	0	6	0	7	5	0	5	0	0	0	33
KEISHO	3FYN4	Seattle	0	0	0	0	0	0	0	8	38	2	0	0	48
APL KENNEDY	9VAY4	Seattle	0	0	0	0	53	75	34	71	64	45	29	49	420
KEE LUNG	BHFN	Seattle	50	83	34	45	2	0	0	0	0	0	0	0	214
IBIS ARROW	C6CU6	Seattle	0	0	17	23	14	29	0	0	36	28	0	78	225
STELLAR VOYAGER	C6FV4	Seattle	0	0	0	0	0	0	0	0	0	36	42	10	88
CORMORANT ARROW	C6IO9	Seattle	0	0	34	46	24	57	6	27	35	25	20	21	295
WESTWOOD MARIANNE	C6QD3	Seattle	50	48	30	49	42	48	55	14	63	41	115	43	598
WESTWOOD ANETTE	C6QO9	Seattle	16	6	16	24	5	0	25	16	9	10	16	31	174
WESTWOOD RAINIER	C6SI3	Seattle	78	44	41	36	40	99	65	53	25	30	21	34	566
WESTWOOD COLUMBIA	C6SI4	Seattle	0	0	37	31	25	23	19	25	28	29	30	50	297
WESTWOOD VICTORIA	C6SI6	Seattle	0	0	0	0	0	0	0	0	0	44	47	41	132
CSL CABO	D5XH	Seattle	0	12	20	33	32	21	17	8	10	13	20	18	204
EVERETT EXPRESS	DPGD	Seattle	32	32	25	30	29	24	15	11	35	46	28	16	323
PUSAN SENATOR	DQVG	Seattle	34	29	36	25	28	9	4	30	13	22	23	31	284
PENANG SENATOR	DQVH	Seattle	37	47	20	41	31	14	37	15	51	79	28	72	472
GLORIOUS SUCCESS	DUHN	Seattle	34	0	0	4	0	1	0	0	0	0	0	0	39
RUBIN KOBE	DYZM	Seattle	5	16	18	12	20	20	1	18	0	18	0	0	128
OCEAN SPIRIT	ELKI8	Seattle	0	0	0	0	0	0	0	0	0	1	0	0	1
SANTA BARBARA	ELOT3	Seattle	34	42	47	43	24	37	20	30	22	43	17	35	394
WORLD SPIRIT	ELWG7	Seattle	42	34	44	45	28	29	0	1	0	0	0	0	223
UNITED SPIRIT	ELYB2	Seattle	34	32	31	46	37	53	14	29	47	63	93	63	542
ORIENTE SHINE	H9AL	Seattle	17	15	13	0	0	0	0	0	0	0	0	0	45
WESTWOOD JAGO	H9IL	Seattle	14	20	0	0	2	0	0	0	0	0	0	0	36
ORIENTE CREST	HPFA	Seattle	0	0	0	0	0	0	0	0	0	16	24	0	40
WESTWARD VENTURE	KHJB	Seattle	0	19	27	55	57	50	42	95	31	1	0	1	378
NORTH STAR	KIYI	Seattle	0	0	0	0	0	0	0	0	32	34	61	68	195
THOMAS G. THOMPSON	KTDQ	Seattle	0	6	33	46	52	82	41	26	14	6	0	0	306
SKAUGRAN	LADB2	Seattle	31	46	52	73	43	37	23	14	0	7	32	59	417
STAR DOVER	LAEP4	Seattle	36	30	0	38	0	0	0	0	0	1	35	0	140
WESTWOOD BORG	LAON4	Seattle	82	43	85	48	68	44	65	48	44	72	52	78	729
WESTWOOD BREEZE	LAOT4	Seattle	47	63	43	44	53	71	43	24	31	66	18	0	503
USCGC POLAR STAR (WAGB 1	NBTM	Seattle	0	0	0	0	0	0	0	1	1	0	155	153	310
USCGC HEALY WAGB-20	NEPP	Seattle	123	54	83	3	0	45	60	53	83	56	2	0	562
USCGC MIDGETT (WHEC 726)	NHWR	Seattle	0	0	0	0	0	0	0	0	0	0	7	0	7
USCGC POLAR SEA WAGB 11	NRUO	Seattle	83	86	252	78	0	0	0	0	0	18	29	89	635
COLUMBINE MAERSK	OUHC2	Seattle	4	38	1	0	0	0	0	54	0	1	52	0	150
CLEMENTINE MAERSK	OUQK2	Seattle	0	0	0	1	0	19	7	0	22	5	0	37	91
AXEL MAERSK	OUUY2	Seattle	0	0	0	0	0	0	0	0	0	26	5	0	31
A.P. MOLLER	OVYQ2	Seattle	0	31	20	0	17	21	0	23	20	0	55	26	213
CHARLOTTE MAERSK	OWLD2	Seattle	0	42	20	0	15	19	0	29	19	0	31	21	196
CORNELIA MAERSK	OWWS2	Seattle	0	0	0	0	0	40	24	0	24	17	0	23	128
SOVEREIGN MAERSK	OYGA2	Seattle	0	11	48	0	3	23	0	0	0	33	48	0	166

VOS Cooperative Ship Report



Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SUSAN MAERSK	OYIK2	Seattle	0	0	0	0	0	0	0	0	0	19	0	4	23
SVEND MAERSK	OYJS2	Seattle	19	20	0	29	13	18	38	25	0	26	22	0	210
SOROE MAERSK	OYKJ2	Seattle	31	13	0	25	36	0	38	28	0	26	30	0	227
SALLY MAERSK	OZHS2	Seattle	0	0	0	0	0	0	65	0	0	56	0	0	121
SINE MAERSK	OZOK2	Seattle	36	1	0	24	0	0	0	35	0	0	13	0	109
SVENDBORG MAERSK	OZSK2	Seattle	34	42	0	0	40	0	0	19	37	2	15	44	233
CARSTEN MAERSK	OZYB2	Seattle	51	0	0	0	0	0	0	0	0	0	0	0	51
CHASTINE MAERSK	OZZB2	Seattle	0	0	33	4	0	66	0	0	52	1	0	28	184
HANJIN KAOHSIUNG	P3BN8	Seattle	0	0	0	0	0	0	0	25	18	18	0	0	61
NORDMAX	P3YS5	Seattle	77	58	46	55	94	57	88	15	74	65	87	58	774
MAERSK SEA	S6CW	Seattle	0	58	3	36	37	0	0	0	0	2	0	0	136
APL JAPAN	S6TS	Seattle	38	43	51	68	52	49	66	63	85	61	95	77	748
KAPITAN KONEV	UAHV	Seattle	0	0	1	8	7	5	7	0	16	0	0	0	44
VLADIVOSTOK	UBXP	Seattle	71	56	63	48	41	44	51	52	36	62	34	41	599
KAPITAN AFANASYEV	UFIL	Seattle	16	10	6	19	8	0	0	0	0	0	0	0	59
TYCOM RELIANCE	V7CZ2	Seattle	0	0	0	27	30	0	0	0	0	1	0	0	58
HATSU ETHIC	VQFS4	Seattle	0	0	15	15	10	24	20	16	22	24	29	53	228
OOCL CALIFORNIA	VRWC8	Seattle	50	42	53	51	73	47	39	52	39	52	25	24	547
ISLA DE CEDROS	VRXU2	Seattle	113	54	82	72	50	109	67	105	38	37	96	79	902
HATSU ELITE	VSJG7	Seattle	0	0	0	0	0	0	0	0	0	20	12	9	41
HATSU ENVOY	VSQL9	Seattle	67	51	72	67	55	47	60	59	44	51	97	66	736
HATSU EXCEL	VSXV3	Seattle	48	51	46	11	15	42	24	19	18	17	16	21	328
MAHARASHTRA	VTSQ	Seattle	0	0	0	0	0	0	0	0	0	12	0	2	14
MIDNIGHT SUN	WAHG	Seattle	0	0	0	0	28	53	45	30	19	39	97	88	399
NATHANIEL B. PALMER	WBP3210	Seattle	13	0	0	0	0	18	73	81	45	12	0	0	242
COASTAL MERCHANT	WCV8696	Seattle	10	0	4	10	9	0	0	21	0	4	0	0	58
GREAT LAND	WFDP	Seattle	121	146	154	70	138	151	125	179	1	15	6	90	1196
PRESIDENT TRUMAN	WNDP	Seattle	37	47	66	70	29	32	46	55	40	10	58	56	546
PRESIDENT JACKSON	WRYC	Seattle	58	68	65	57	59	68	55	61	47	52	49	59	698
PRESIDENT POLK	WRYD	Seattle	32	70	57	45	28	63	139	89	63	43	12	60	701
PRESIDENT ADAMS	WRYW	Seattle	65	62	74	35	66	88	65	56	74	64	75	67	791
WECOMA	WSD7079	Seattle	59	69	38	61	97	80	61	69	79	18	0	0	631
NOAA SHIP MILLER FREEMAN	WTDM	Seattle	0	129	165	6	156	157	157	40	114	40	30	0	994
NOAA SHIP RAINIER	WTEF	Seattle	1	0	0	0	0	1	25	2	0	1	0	0	30
NOAA SHIP MCARTHUR II	WTEJ	Seattle	0	0	0	0	0	2	134	185	171	159	216	109	976
RUBIN PEARL	YJQA8	Seattle	0	0	0	0	0	0	0	19	0	21	11	6	57
HATSU EAGLE	ZNZH6	Seattle	0	0	0	7	7	3	21	10	5	11	15	14	93
Seattle Ships: 101		Totals:	2194	2271	2543	2067	2224	2434	2328	2221	2065	2131	2627	2395	27500

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
POLAR TEXAS	KNFD	Valdez	19	14	23	10	15	18	14	6	11	16	20	15	181
POLAR ALASKA	KSBK	Valdez	8	13	9	10	11	8	0	11	6	8	13	18	115
GUARD	WCY2823	Valdez	0	0	0	0	0	0	0	1	0	0	0	0	1
TAN'ERLIQ	WCY8497	Valdez	1	0	0	0	0	0	0	0	0	0	0	0	1
SEARIVER GALENA BAY	WGZK	Valdez	0	0	0	0	1	2	0	0	0	0	0	0	3
Valdez Ships: 5		Totals:	28	27	32	20	27	28	14	18	17	24	33	33	301

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total Ships: 612	Totals:	11411	9986	12382	11202	12305	13610	14720	14629	13332	13699	14215	12656	154147

VOS Cooperative Ship Report: January and February 2004

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
JAG PRAKASH	AUBK	Anchorage	87	51	0	0	0	0	0	0	0	0	0	0	138
POLAR EAGLE	ELPT3	Anchorage	179	120	0	0	0	0	0	0	0	0	0	0	299
ARCTIC SUN	ELQB8	Anchorage	183	119	0	0	0	0	0	0	0	0	0	0	302
HORIZON ANCHORAGE	KGTX	Anchorage	86	33	0	0	0	0	0	0	0	0	0	0	119
HORIZON TACOMA	KGTY	Anchorage	51	46	0	0	0	0	0	0	0	0	0	0	97
HORIZON KODIAK	KGTZ	Anchorage	44	32	0	0	0	0	0	0	0	0	0	0	76
LYKES EAGLE	VSUA7	Anchorage	12	5	0	0	0	0	0	0	0	0	0	0	17
OCEAN RANGER	WAM7635	Anchorage	0	3	0	0	0	0	0	0	0	0	0	0	3
GALE WIND	WAZ9548	Anchorage	1	2	0	0	0	0	0	0	0	0	0	0	3
GUARDSMAN	WBN5978	Anchorage	67	45	0	0	0	0	0	0	0	0	0	0	112
OCEAN MARINER	WCF3990	Anchorage	1	0	0	0	0	0	0	0	0	0	0	0	1
SEABULK MONTANA	WCW9126	Anchorage	88	81	0	0	0	0	0	0	0	0	0	0	169
GULF TITAN	WDA5598	Anchorage	7	8	0	0	0	0	0	0	0	0	0	0	15
WESTERN MARINER	WRB9690	Anchorage	1	0	0	0	0	0	0	0	0	0	0	0	1
ALASKA MARINER	WSM5364	Anchorage	1	0	0	0	0	0	0	0	0	0	0	0	1
BRUCE	WWU8	Anchorage	36	16	0	0	0	0	0	0	0	0	0	0	52
Anchorage Ships: 17	Totals:		844	561	0	0	0	0	0	0	0	0	0	0	1405

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MAERSK TAIKI	9VIG	Baltimore	46	25	0	0	0	0	0	0	0	0	0	0	71
PREMIUM DO BRASIL	A8BL4	Baltimore	26	19	0	0	0	0	0	0	0	0	0	0	45
M/T SUN VOYAGER	C6FD3	Baltimore	1	0	0	0	0	0	0	0	0	0	0	0	1
GALAXY	C6FU6	Baltimore	3	2	0	0	0	0	0	0	0	0	0	0	5
CHIQUITA SCANDINAVIA	C6KD4	Baltimore	64	31	0	0	0	0	0	0	0	0	0	0	95
CHIQUITA ITALIA	C6KD5	Baltimore	48	34	0	0	0	0	0	0	0	0	0	0	82
CHIQUITA NEDERLAND	C6KD6	Baltimore	36	31	0	0	0	0	0	0	0	0	0	0	67
CHIQUITA BELGIE	C6KD7	Baltimore	51	41	0	0	0	0	0	0	0	0	0	0	92
CHIQUITA DEUTSCHLAND	C6KD8	Baltimore	76	39	0	0	0	0	0	0	0	0	0	0	115
CHIQUITA SCHWEIZ	C6KD9	Baltimore	49	21	0	0	0	0	0	0	0	0	0	0	70
TROJAN STAR	C6OD7	Baltimore	21	0	0	0	0	0	0	0	0	0	0	0	21
ALTAIR VOYAGER	C6OK	Baltimore	82	53	0	0	0	0	0	0	0	0	0	0	135
EDYTH L	C6YC	Baltimore	46	20	0	0	0	0	0	0	0	0	0	0	66
FRANCES L	C6YE	Baltimore	34	30	0	0	0	0	0	0	0	0	0	0	64
HADERA	ELBX4	Baltimore	0	7	0	0	0	0	0	0	0	0	0	0	7
SOL DO BRASIL	ELQQ4	Baltimore	4	2	0	0	0	0	0	0	0	0	0	0	6
PITTSBURG	ELTQ6	Baltimore	72	38	0	0	0	0	0	0	0	0	0	0	110
SAUDI ABHA	HZRX	Baltimore	33	3	0	0	0	0	0	0	0	0	0	0	36
MAERSK ALASKA	KAKF	Baltimore	20	31	0	0	0	0	0	0	0	0	0	0	51
TAKASAGO	LACR5	Baltimore	35	21	0	0	0	0	0	0	0	0	0	0	56
STAR HARMONIA	LAGB5	Baltimore	78	0	0	0	0	0	0	0	0	0	0	0	78
STAR ISMENE	LANT5	Baltimore	31	45	0	0	0	0	0	0	0	0	0	0	76
STAR HERDLA	LAVD4	Baltimore	0	25	0	0	0	0	0	0	0	0	0	0	25
STAR ALABAMA	LAVU4	Baltimore	32	18	0	0	0	0	0	0	0	0	0	0	50
STAR EAGLE	LAWO2	Baltimore	55	25	0	0	0	0	0	0	0	0	0	0	80
TREIN MAERSK	MSQQ8	Baltimore	46	21	0	0	0	0	0	0	0	0	0	0	67
STAR INDIANA	S6BE	Baltimore	20	8	0	0	0	0	0	0	0	0	0	0	28
FIGARO	S6PI	Baltimore	18	0	0	0	0	0	0	0	0	0	0	0	18
MAERSK WIND	S6TY	Baltimore	4	0	0	0	0	0	0	0	0	0	0	0	4
TYCO RESPONDER	V7CY9	Baltimore	48	12	0	0	0	0	0	0	0	0	0	0	60
M/V RESOLVE	WCZ5535	Baltimore	39	6	0	0	0	0	0	0	0	0	0	0	45
M/V FREEDOM	WDB5483	Baltimore	34	21	0	0	0	0	0	0	0	0	0	0	55
GREEN LAKE	WDDI	Baltimore	11	57	0	0	0	0	0	0	0	0	0	0	68
M/V PATRIOT	WQVY	Baltimore	9	12	0	0	0	0	0	0	0	0	0	0	21
INDEPENDENCE	WRYG	Baltimore	33	45	0	0	0	0	0	0	0	0	0	0	78

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LIBERTY	WRYX	Baltimore	27	28	0	0	0	0	0	0	0	0	0	0	55
ITB BALTIMORE	WXKM	Baltimore	7	9	0	0	0	0	0	0	0	0	0	0	16
COURTNEY L	ZCAQ8	Baltimore	26	11	0	0	0	0	0	0	0	0	0	0	37
DUHALLOW	ZCBH9	Baltimore	24	6	0	0	0	0	0	0	0	0	0	0	30
SKODSBORG	ZCIJ7	Baltimore	19	17	0	0	0	0	0	0	0	0	0	0	36
Baltimore Ships: 40	Totals:		1308	814	0	0	0	0	0	0	0	0	0	0	2122

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SEALAND RACER	MCDW2	Charleston	46	0	0	0	0	0	0	0	0	0	0	0	46
MAERSK CAROLINA	WBDS	Charleston	9	0	0	0	0	0	0	0	0	0	0	0	9
Charleston Ships: 2	Totals:		55	0	0	0	0	0	0	0	0	0	0	0	55

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
USCGC MACKINAW	NRKP	Chicago	0	3	0	0	0	0	0	0	0	0	0	0	3
SOUTHDOWN CHALLENGER	WA4659	Chicago	4	0	0	0	0	0	0	0	0	0	0	0	4
KAYE E. BARKER	WCF3012	Chicago	4	0	0	0	0	0	0	0	0	0	0	0	4
JACKLYN M.	WCV7620	Chicago	10	0	0	0	0	0	0	0	0	0	0	0	10
REBECCA LYNN	WCW7977	Chicago	1	0	0	0	0	0	0	0	0	0	0	0	1
STEWART J. CORT	WDB4570	Chicago	15	0	0	0	0	0	0	0	0	0	0	0	15
BURNS HARBOR	WDB4745	Chicago	4	0	0	0	0	0	0	0	0	0	0	0	4
JOHN G. MUNSON	WE3806	Chicago	12	0	0	0	0	0	0	0	0	0	0	0	12
ARTHUR M. ANDERSON	WE4805	Chicago	49	0	0	0	0	0	0	0	0	0	0	0	49
CASON J. CALLAWAY	WE4879	Chicago	1	0	0	0	0	0	0	0	0	0	0	0	1
EDGAR B. SPEER	WQZ9670	Chicago	69	0	0	0	0	0	0	0	0	0	0	0	69
INDIANA HARBOR	WXN3191	Chicago	40	0	0	0	0	0	0	0	0	0	0	0	40
JAMES R. BARKER	WYP8657	Chicago	94	0	0	0	0	0	0	0	0	0	0	0	94
MESABI MINER	WYQ4356	Chicago	14	0	0	0	0	0	0	0	0	0	0	0	14
PAUL R. TREGURTHA	WYR4481	Chicago	42	0	0	0	0	0	0	0	0	0	0	0	42
PRESQUE ISLE	WZE4928	Chicago	27	0	0	0	0	0	0	0	0	0	0	0	27
ROGER BLOUGH	WZP8164	Chicago	29	0	0	0	0	0	0	0	0	0	0	0	29
Chicago Ships: 17	Totals:		415	3	0	0	0	0	0	0	0	0	0	0	418

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
NOAA SHIP KA'IMIMOANA	WTEU	Honolulu	12	0	0	0	0	0	0	0	0	0	0	0	12
Honolulu Ships: 1	Totals:		12	0	0	0	0	0	0	0	0	0	0	0	12

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EASTERN EXPRESS	3FDN7	Houston	21	9	0	0	0	0	0	0	0	0	0	0	30
NORWGEIAN SEA	C6DM2	Houston	0	30	0	0	0	0	0	0	0	0	0	0	30
CELEBRATION	H3GQ	Houston	19	13	0	0	0	0	0	0	0	0	0	0	32
DEEPWATER HORIZON	H3SM	Houston	43	68	0	0	0	0	0	0	0	0	0	0	111
SAUDI DIRIYAH	HZZB	Houston	42	10	0	0	0	0	0	0	0	0	0	0	52
SAUDI HOFUF	HZZC	Houston	57	35	0	0	0	0	0	0	0	0	0	0	92
SAUDI TABUK	HZZD	Houston	37	29	0	0	0	0	0	0	0	0	0	0	66
CAPE VINCENT	KAES	Houston	0	31	0	0	0	0	0	0	0	0	0	0	31
CHEMICAL PIONEER	KAFO	Houston	15	1	0	0	0	0	0	0	0	0	0	0	16
GUS W. DARNELL	KCDK	Houston	23	15	0	0	0	0	0	0	0	0	0	0	38
CLEVELAND	KGXA	Houston	45	14	0	0	0	0	0	0	0	0	0	0	59
SEALAND DEVELOPER	KHRH	Houston	28	18	0	0	0	0	0	0	0	0	0	0	46
CHEMICAL EXPLORER	KRGC	Houston	16	12	0	0	0	0	0	0	0	0	0	0	28
SEALAND FLORIDA	KRHX	Houston	114	28	0	0	0	0	0	0	0	0	0	0	142

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LIBERTY WAVE	KRHZ	Houston	0	3	0	0	0	0	0	0	0	0	0	0	3
SEALAND ATLANTIC	KRLZ	Houston	76	51	0	0	0	0	0	0	0	0	0	0	127
SEALAND QUALITY	KRNJ	Houston	57	23	0	0	0	0	0	0	0	0	0	0	80
SEALAND COMMITMENT	KRPB	Houston	64	40	0	0	0	0	0	0	0	0	0	0	104
SEALAND PERFORMANCE	KRPD	Houston	30	29	0	0	0	0	0	0	0	0	0	0	59
NOBEL STAR	KRPP	Houston	68	25	0	0	0	0	0	0	0	0	0	0	93
CYNTHIA FAGAN	KSDF	Houston	47	15	0	0	0	0	0	0	0	0	0	0	62
STAR ISTIND	LAMP5	Houston	30	28	0	0	0	0	0	0	0	0	0	0	58
STAR FLORIDA	LAVW4	Houston	24	0	0	0	0	0	0	0	0	0	0	0	24
STAR FRASER	LAVY4	Houston	0	31	0	0	0	0	0	0	0	0	0	0	31
RHAPSODY OF THE SEAS	LAZK4	Houston	75	49	0	0	0	0	0	0	0	0	0	0	124
USNS MARY SEARS (T-AGS 6	NRFR	Houston	1	0	0	0	0	0	0	0	0	0	0	0	1
PACIFIC EXPLORER	V7DN3	Houston	40	32	0	0	0	0	0	0	0	0	0	0	72
NUEVO LEON	VQHV6	Houston	9	0	0	0	0	0	0	0	0	0	0	0	9
TMM CAMPECHE	VSXC9	Houston	2	1	0	0	0	0	0	0	0	0	0	0	3
SEALAND MOTIVATOR	WAAH	Houston	88	30	0	0	0	0	0	0	0	0	0	0	118
LYKES MOTIVATOR	WABU	Houston	30	15	0	0	0	0	0	0	0	0	0	0	45
SEALAND PRIDE	WDA3673	Houston	85	41	0	0	0	0	0	0	0	0	0	0	126
OVERSEAS NEW ORLEANS	WFKW	Houston	25	25	0	0	0	0	0	0	0	0	0	0	50
OVERSEAS MARILYN	WFQB	Houston	6	0	0	0	0	0	0	0	0	0	0	0	6
LYKES EXPLORER	WGLA	Houston	48	48	0	0	0	0	0	0	0	0	0	0	96
LYKES NAVIGATOR	WGMJ	Houston	101	64	0	0	0	0	0	0	0	0	0	0	165
LYKES LIBERATOR	WGXN	Houston	77	48	0	0	0	0	0	0	0	0	0	0	125
LYKES DISCOVERER	WGXO	Houston	136	48	0	0	0	0	0	0	0	0	0	0	184
SEALAND ACHIEVER	WPKD	Houston	32	18	0	0	0	0	0	0	0	0	0	0	50
SEALAND INTEGRITY	WPVD	Houston	273	116	0	0	0	0	0	0	0	0	0	0	389
OVERSEAS HARRIETTE	WRFJ	Houston	29	40	0	0	0	0	0	0	0	0	0	0	69
MAERSK CONSTELLATION	WRYJ	Houston	3	0	0	0	0	0	0	0	0	0	0	0	3
BUFFALO SOLDIER	WWXB	Houston	0	21	0	0	0	0	0	0	0	0	0	0	21
HUMBER ARM	ZCBQ2	Houston	29	4	0	0	0	0	0	0	0	0	0	0	33
SKANDERBORG	ZCIG4	Houston	31	0	0	0	0	0	0	0	0	0	0	0	31
LYKES RANGER	ZIYE7	Houston	0	6	0	0	0	0	0	0	0	0	0	0	6
LYKES RANGER	ZIYE7	Houston	0	12	0	0	0	0	0	0	0	0	0	0	12
LYKES RANGER	ZIYE7	Houston	0	12	0	0	0	0	0	0	0	0	0	0	12
LYKES RANGER	ZIYE7	Houston	0	13	0	0	0	0	0	0	0	0	0	0	13
LYKES RANGER	ZIYE7	Houston	0	13	0	0	0	0	0	0	0	0	0	0	13
LYKES RANGER	ZIYE7	Houston	0	15	0	0	0	0	0	0	0	0	0	0	15
LYKES RANGER	ZIYE7	Houston	20	0	0	0	0	0	0	0	0	0	0	0	20
LYKES RANGER	ZIYE7	Houston	20	0	0	0	0	0	0	0	0	0	0	0	20
LYKES RANGER	ZIYE7	Houston	20	0	0	0	0	0	0	0	0	0	0	0	20
LYKES RANGER	ZIYE7	Houston	20	0	0	0	0	0	0	0	0	0	0	0	20
LYKES RANGER	ZIYE7	Houston	20	6	0	0	0	0	0	0	0	0	0	0	26
Houston Ships: 57	Totals:		2076	1235	0	0	0	0	0	0	0	0	0	0	3311

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CARNIVAL GLORY	3FPS9	Jacksonville	34	15	0	0	0	0	0	0	0	0	0	0	49
SEALAND ARGENTINA	DGVN	Jacksonville	30	0	0	0	0	0	0	0	0	0	0	0	30
SOLAR WING	ELJS7	Jacksonville	92	65	0	0	0	0	0	0	0	0	0	0	157
CARNIVAL FANTASY	H3GS	Jacksonville	0	1	0	0	0	0	0	0	0	0	0	0	1
HARMONY ACE	H3QA	Jacksonville	60	30	0	0	0	0	0	0	0	0	0	0	90
LTC CALVIN P. TITUS	KJLV	Jacksonville	10	9	0	0	0	0	0	0	0	0	0	0	19
STAR EVVIVA	LAHE2	Jacksonville	59	43	0	0	0	0	0	0	0	0	0	0	102
TALISMAN	LAOW5	Jacksonville	20	17	0	0	0	0	0	0	0	0	0	0	37
STAR AMERICA	LAVV4	Jacksonville	43	15	0	0	0	0	0	0	0	0	0	0	58
STAR HANSA	LAXP4	Jacksonville	12	0	0	0	0	0	0	0	0	0	0	0	12
1ST LT HARRY L. MARTIN	NDFH	Jacksonville	0	2	0	0	0	0	0	0	0	0	0	0	2
GREEN DALE	WCZ5238	Jacksonville	16	5	0	0	0	0	0	0	0	0	0	0	21

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EL YUNQUE	WGJT	Jacksonville	3	30	0	0	0	0	0	0	0	0	0	0	33
NOAA SHIP OSCAR ELTON SE	WTEE	Jacksonville	53	5	0	0	0	0	0	0	0	0	0	0	58
OVERSEAS JOYCE	WUQL	Jacksonville	19	16	0	0	0	0	0	0	0	0	0	0	35
HORIZON CHALLENGER	WZJC	Jacksonville	35	28	0	0	0	0	0	0	0	0	0	0	63
HORIZON DISCOVERY	WZJD	Jacksonville	42	27	0	0	0	0	0	0	0	0	0	0	69
HORIZON CRUSADER	WZJF	Jacksonville	82	32	0	0	0	0	0	0	0	0	0	0	114
Jacksonville Ships: 18	Totals:		610	340	0	0	0	0	0	0	0	0	0	0	950

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
OVERSEAS CHICAGO	KBCF	Kodiak	37	20	0	0	0	0	0	0	0	0	0	0	57
TONSINA	KJDG	Kodiak	11	19	0	0	0	0	0	0	0	0	0	0	30
COIN OF THE REALM	KL0YL	Kodiak	24	16	0	0	0	0	0	0	0	0	0	0	40
USCGC ALEX HALEY	NZPO	Kodiak	0	2	0	0	0	0	0	0	0	0	0	0	2
LNG GEMINI	V7BW9	Kodiak	30	13	0	0	0	0	0	0	0	0	0	0	43
OCEAN RELIANCE	WADY	Kodiak	1	3	0	0	0	0	0	0	0	0	0	0	4
COASTAL RELIANCE	WADZ	Kodiak	16	4	0	0	0	0	0	0	0	0	0	0	20
NORTHERN SPIRIT	WAQ2746	Kodiak	26	73	0	0	0	0	0	0	0	0	0	0	99
VIKING STAR	WAS4138	Kodiak	10	5	0	0	0	0	0	0	0	0	0	0	15
TITAN	WAW9232	Kodiak	7	5	0	0	0	0	0	0	0	0	0	0	12
NATOMA	WBB5799	Kodiak	6	0	0	0	0	0	0	0	0	0	0	0	6
BLARNEY	WBP4766	Kodiak	0	3	0	0	0	0	0	0	0	0	0	0	3
COASTAL PILOT	WBP7281	Kodiak	3	0	0	0	0	0	0	0	0	0	0	0	3
SAMSON MARINER	WCN3586	Kodiak	5	0	0	0	0	0	0	0	0	0	0	0	5
MANFRED NYSTROM	WCN3590	Kodiak	0	3	0	0	0	0	0	0	0	0	0	0	3
PACIFIC PRIDE	WCN4995	Kodiak	0	3	0	0	0	0	0	0	0	0	0	0	3
NAVAJO	WCT5737	Kodiak	2	8	0	0	0	0	0	0	0	0	0	0	10
STIMSON	WCY2270	Kodiak	26	4	0	0	0	0	0	0	0	0	0	0	30
WOLDSTAD	WCY2271	Kodiak	19	22	0	0	0	0	0	0	0	0	0	0	41
CHINOOK	WCY2791	Kodiak	7	0	0	0	0	0	0	0	0	0	0	0	7
SEABULK PRIDE	WCY7052	Kodiak	34	19	0	0	0	0	0	0	0	0	0	0	53
SEABULK ARCTIC	WCY7054	Kodiak	22	16	0	0	0	0	0	0	0	0	0	0	38
JOHN BRIX	WCY7560	Kodiak	7	17	0	0	0	0	0	0	0	0	0	0	24
BOUCHARD BOYS	WCY7761	Kodiak	8	6	0	0	0	0	0	0	0	0	0	0	14
MAUNA LOA	WCY8398	Kodiak	3	0	0	0	0	0	0	0	0	0	0	0	3
SEABULK COURAGE	WCY8453	Kodiak	61	27	0	0	0	0	0	0	0	0	0	0	88
TRIDENT	WCZ2913	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
NORTHERN VICTOR	WCZ6534	Kodiak	12	0	0	0	0	0	0	0	0	0	0	0	12
PARAGON	WDA2311	Kodiak	78	55	0	0	0	0	0	0	0	0	0	0	133
PACIFIC CHALLENGER	WDA3588	Kodiak	81	19	0	0	0	0	0	0	0	0	0	0	100
CORBIN FOSS	WDB5265	Kodiak	0	5	0	0	0	0	0	0	0	0	0	0	5
SEA RELIANCE	WEOB	Kodiak	18	12	0	0	0	0	0	0	0	0	0	0	30
TAKU	WI9491	Kodiak	12	4	0	0	0	0	0	0	0	0	0	0	16
OVERSEAS NEW YORK	WMCK	Kodiak	46	12	0	0	0	0	0	0	0	0	0	0	58
TUSTUMENA	WNGW	Kodiak	105	21	0	0	0	0	0	0	0	0	0	0	126
KENAI	WSNB	Kodiak	25	67	0	0	0	0	0	0	0	0	0	0	92
CAPT LES EASON	WTT8587	Kodiak	2	0	0	0	0	0	0	0	0	0	0	0	2
MIKI HANA	WTW9252	Kodiak	5	0	0	0	0	0	0	0	0	0	0	0	5
JOSEPH SAUSE	WTW9258	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
HENRY SAUSE	WTW9259	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
ROUGHNECK	WTW9262	Kodiak	3	3	0	0	0	0	0	0	0	0	0	0	6
OCEAN SERVICE	WTW9263	Kodiak	5	1	0	0	0	0	0	0	0	0	0	0	6
ROBERT L.	WTW9264	Kodiak	0	1	0	0	0	0	0	0	0	0	0	0	1
SALISHAN	WUT4384	Kodiak	5	2	0	0	0	0	0	0	0	0	0	0	7
SOUND RELIANCE	WXAE	Kodiak	24	11	0	0	0	0	0	0	0	0	0	0	35
MALOLO	WYH6327	Kodiak	6	8	0	0	0	0	0	0	0	0	0	0	14
JUSTINE FOSS	WYL4978	Kodiak	8	4	0	0	0	0	0	0	0	0	0	0	12
AURORA	WYM9567	Kodiak	17	12	0	0	0	0	0	0	0	0	0	0	29

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
AGNES FOSS	WYZ3112	Kodiak	7	2	0	0	0	0	0	0	0	0	0	0	9
Kodiak Ships: 49	Totals:		827	527	0	0	0	0	0	0	0	0	0	0	1354

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EVER ROYAL	3FGI3	Long Beach	0	6	0	0	0	0	0	0	0	0	0	0	6
CALIFORNIA JUPITER	ELKU8	Long Beach	0	5	0	0	0	0	0	0	0	0	0	0	5
P&O NEDLLOYD YANTIAN	ELYD5	Long Beach	66	42	0	0	0	0	0	0	0	0	0	0	108
SEALAND EXPRESS	KGJD	Long Beach	15	57	0	0	0	0	0	0	0	0	0	0	72
SEALAND VOYAGER	KHRK	Long Beach	69	56	0	0	0	0	0	0	0	0	0	0	125
SEALAND EAGLE	MCDZ9	Long Beach	0	18	0	0	0	0	0	0	0	0	0	0	18
MATHILDE MAERSK	OUUU2	Long Beach	16	30	0	0	0	0	0	0	0	0	0	0	46
MAREN MAERSK	OWZU2	Long Beach	38	0	0	0	0	0	0	0	0	0	0	0	38
METTE MAERSK	OXKT2	Long Beach	23	13	0	0	0	0	0	0	0	0	0	0	36
DIRCH MAERSK	OXQP2	Long Beach	4	48	0	0	0	0	0	0	0	0	0	0	52
MARGRETHE MAERSK	OYSN2	Long Beach	30	9	0	0	0	0	0	0	0	0	0	0	39
TAUSALA SAMOA	V2FA2	Long Beach	17	37	0	0	0	0	0	0	0	0	0	0	54
OOCL NETHERLANDS	VRVN6	Long Beach	4	0	0	0	0	0	0	0	0	0	0	0	4
OOCL FAIR	VRWB8	Long Beach	38	15	0	0	0	0	0	0	0	0	0	0	53
OOCL FIDELITY	VRWG5	Long Beach	1	0	0	0	0	0	0	0	0	0	0	0	1
HORIZON CONSUMER	WCHF	Long Beach	21	24	0	0	0	0	0	0	0	0	0	0	45
APL SINGAPORE	WCX8812	Long Beach	47	35	0	0	0	0	0	0	0	0	0	0	82
APL THAILAND	WCX8882	Long Beach	58	19	0	0	0	0	0	0	0	0	0	0	77
APL KOREA	WCX8883	Long Beach	14	7	0	0	0	0	0	0	0	0	0	0	21
APL PHILIPPINES	WCX8884	Long Beach	49	22	0	0	0	0	0	0	0	0	0	0	71
PRESIDENT GRANT	WCY2098	Long Beach	55	34	0	0	0	0	0	0	0	0	0	0	89
PRESIDENT WILSON	WCY3438	Long Beach	26	33	0	0	0	0	0	0	0	0	0	0	59
APL CHINA	WDB3161	Long Beach	39	30	0	0	0	0	0	0	0	0	0	0	69
MELVILLE	WECB	Long Beach	45	29	0	0	0	0	0	0	0	0	0	0	74
EWA	WEZM	Long Beach	59	36	0	0	0	0	0	0	0	0	0	0	95
HORIZON RELIANCE	WFLH	Long Beach	78	42	0	0	0	0	0	0	0	0	0	0	120
POLAR CALIFORNIA	WMCV	Long Beach	9	14	0	0	0	0	0	0	0	0	0	0	23
HORIZON NAVIGATOR	WPGK	Long Beach	29	47	0	0	0	0	0	0	0	0	0	0	76
R.J. PFEIFFER	WRJP	Long Beach	30	24	0	0	0	0	0	0	0	0	0	0	54
MAUI	WSLH	Long Beach	52	39	0	0	0	0	0	0	0	0	0	0	91
KAUAI	WSRH	Long Beach	63	42	0	0	0	0	0	0	0	0	0	0	105
HORIZON PACIFIC	WSRL	Long Beach	69	39	0	0	0	0	0	0	0	0	0	0	108
DENALI	WSVR	Long Beach	16	11	0	0	0	0	0	0	0	0	0	0	27
NOAA DAVID STARR JORDAN	WTDK	Long Beach	5	0	0	0	0	0	0	0	0	0	0	0	5
Long Beach Ships: 34	Totals:		1085	863	0	0	0	0	0	0	0	0	0	0	1948

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CARNIVAL VICTORY	3FFL8	Miami	9	11	0	0	0	0	0	0	0	0	0	0	20
CARIBBEAN MERCY	3FFU4	Miami	2	0	0	0	0	0	0	0	0	0	0	0	2
CARNIVAL PARADISE	3FOB5	Miami	19	9	0	0	0	0	0	0	0	0	0	0	28
FASCINATION	C6FM9	Miami	0	12	0	0	0	0	0	0	0	0	0	0	12
NAVIGATOR OF THE SEAS	C6FU4	Miami	38	22	0	0	0	0	0	0	0	0	0	0	60
DUNCAN ISLAND	C6JS	Miami	55	27	0	0	0	0	0	0	0	0	0	0	82
CHARLES ISLAND	C6JT	Miami	25	0	0	0	0	0	0	0	0	0	0	0	25
HOOD ISLAND	C6LU4	Miami	44	28	0	0	0	0	0	0	0	0	0	0	72
BARRINGTON ISLAND	C6QK	Miami	45	36	0	0	0	0	0	0	0	0	0	0	81
CELTIC SEA	C6RT	Miami	79	21	0	0	0	0	0	0	0	0	0	0	100
EXPLORER OF THE SEAS	ELWX5	Miami	66	219	0	0	0	0	0	0	0	0	0	0	285
OLIVIA MAERSK	OXKO2	Miami	0	5	0	0	0	0	0	0	0	0	0	0	5
MAASDAM	PFRO	Miami	4	38	0	0	0	0	0	0	0	0	0	0	42
STATENDAM	PHSG	Miami	16	6	0	0	0	0	0	0	0	0	0	0	22

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MEKONG PIONEER	V2JN	Miami	77	6	0	0	0	0	0	0	0	0	0	0	83
ITB NEW YORK	WVDG	Miami	10	2	0	0	0	0	0	0	0	0	0	0	12
CHIQUITA BREMEN	ZCBC5	Miami	44	25	0	0	0	0	0	0	0	0	0	0	69
Miami Ships: 17	Totals:		533	467	0	0	0	0	0	0	0	0	0	0	1000

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MACKINAC BRIDGE	JKES	Newark	53	23	0	0	0	0	0	0	0	0	0	0	76
T/V ENTERPRISE	KVMU	Newark	0	64	0	0	0	0	0	0	0	0	0	0	64
OLUF MAERSK	OXFU2	Newark	33	0	0	0	0	0	0	0	0	0	0	0	33
Newark Ships: 3	Totals:		86	87	0	0	0	0	0	0	0	0	0	0	173

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CARNIVAL CONQUEST	3FPQ9	New Orleans	11	7	0	0	0	0	0	0	0	0	0	0	18
DISCOVERER ENTERPRISE	3FZQ7	New Orleans	9	11	0	0	0	0	0	0	0	0	0	0	20
ZIM ITALIA	4XGT	New Orleans	0	30	0	0	0	0	0	0	0	0	0	0	30
MT VIRGO VOYAGER	C6FG8	New Orleans	7	4	0	0	0	0	0	0	0	0	0	0	11
BERNARDO QUINTANA A	C6KJ5	New Orleans	80	48	0	0	0	0	0	0	0	0	0	0	128
DISCOVERER DEEP SEAS	HP9685	New Orleans	52	27	0	0	0	0	0	0	0	0	0	0	79
ROGER REVELLE	KAOU	New Orleans	95	23	0	0	0	0	0	0	0	0	0	0	118
CAPT STEVEN L BENNETT	KAXO	New Orleans	8	0	0	0	0	0	0	0	0	0	0	0	8
JUDY LITRICO	KCKB	New Orleans	2	1	0	0	0	0	0	0	0	0	0	0	3
POLAR DISCOVERY	WACW	New Orleans	10	8	0	0	0	0	0	0	0	0	0	0	18
POLAR ENDEAVOUR	WCAJ	New Orleans	26	15	0	0	0	0	0	0	0	0	0	0	41
LIBERTY SUN	WCOB	New Orleans	55	21	0	0	0	0	0	0	0	0	0	0	76
LIBERTY SPIRIT	WCPU	New Orleans	31	0	0	0	0	0	0	0	0	0	0	0	31
SHEILA MCDEVITT	WDA4069	New Orleans	23	20	0	0	0	0	0	0	0	0	0	0	43
ATLANTIC FOREST	WDB2122	New Orleans	37	13	0	0	0	0	0	0	0	0	0	0	50
M/T MONTAUK	WDCJ	New Orleans	12	17	0	0	0	0	0	0	0	0	0	0	29
POLAR RESOLUTION	WDJK	New Orleans	55	43	0	0	0	0	0	0	0	0	0	0	98
WILSON	WNPD	New Orleans	36	10	0	0	0	0	0	0	0	0	0	0	46
NOAA SHIP RONALD H BROWN	WTEC	New Orleans	0	10	0	0	0	0	0	0	0	0	0	0	10
NOAAS GORDON GUNTER	WTEO	New Orleans	61	53	0	0	0	0	0	0	0	0	0	0	114
New Orleans Ships: 20	Totals:		610	361	0	0	0	0	0	0	0	0	0	0	971

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EVER DEVELOP	3FLF8	New York City	2	0	0	0	0	0	0	0	0	0	0	0	2
EVER DIADEM	3FOF8	New York City	1	0	0	0	0	0	0	0	0	0	0	0	1
EVER REACH	3FQO4	New York City	0	10	0	0	0	0	0	0	0	0	0	0	10
ZIM ASIA	4XFB	New York City	28	39	0	0	0	0	0	0	0	0	0	0	67
ZIM AMERICA	4XGR	New York City	36	0	0	0	0	0	0	0	0	0	0	0	36
ALBEMARLE ISLAND	C6LU3	New York City	51	26	0	0	0	0	0	0	0	0	0	0	77
INDIAN OCEAN	C6T2063	New York City	28	13	0	0	0	0	0	0	0	0	0	0	41
ATLANTIC OCEAN	C6T2064	New York City	20	23	0	0	0	0	0	0	0	0	0	0	43
ARGONAUT	KFDV	New York City	35	16	0	0	0	0	0	0	0	0	0	0	51
HORIZON HAWAII	KIRF	New York City	71	27	0	0	0	0	0	0	0	0	0	0	98
ITB GROTON	KMJL	New York City	38	20	0	0	0	0	0	0	0	0	0	0	58
NOAA SHIP DELAWARE II	KNBD	New York City	28	48	0	0	0	0	0	0	0	0	0	0	76
MAJESTIC MAERSK	OUJH2	New York City	40	24	0	0	0	0	0	0	0	0	0	0	64
MARIE MAERSK	OULL2	New York City	0	23	0	0	0	0	0	0	0	0	0	0	23
MAGLEBY MAERSK	OUSH2	New York City	13	22	0	0	0	0	0	0	0	0	0	0	35
JOHANNES MAERSK	OWFD2	New York City	35	38	0	0	0	0	0	0	0	0	0	0	73
JENS MAERSK	OYYK2	New York City	0	33	0	0	0	0	0	0	0	0	0	0	33
ENDURANCE	WAUU	New York City	4	45	0	0	0	0	0	0	0	0	0	0	49

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ENDEAVOR	WAUW	New York City	40	33	0	0	0	0	0	0	0	0	0	0	73
ENTERPRISE	WAUY	New York City	64	24	0	0	0	0	0	0	0	0	0	0	88
GREEN POINT	WCY4148	New York City	34	25	0	0	0	0	0	0	0	0	0	0	59
HORIZON PRODUCER	WJBJ	New York City	15	60	0	0	0	0	0	0	0	0	0	0	75
MANUKAI	WRGD	New York City	45	17	0	0	0	0	0	0	0	0	0	0	62
New York City Ships: 22	Totals:		628	566	0	0	0	0	0	0	0	0	0	0	1194

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SEALAND INTREPID	9VWZ	Norfolk	21	0	0	0	0	0	0	0	0	0	0	0	21
P&O NEDLLOYD DAMMAM	A8CA3	Norfolk	4	0	0	0	0	0	0	0	0	0	0	0	4
CSCL XIAMEN	A8CL6	Norfolk	0	15	0	0	0	0	0	0	0	0	0	0	15
JOIDES RESOLUTION	D5BC	Norfolk	27	0	0	0	0	0	0	0	0	0	0	0	27
CONTI MALACA	DGVZ	Norfolk	43	30	0	0	0	0	0	0	0	0	0	0	73
DIRECT TUI	ELVZ5	Norfolk	84	50	0	0	0	0	0	0	0	0	0	0	134
CONTSHIP ROME	ELVZ6	Norfolk	7	12	0	0	0	0	0	0	0	0	0	0	19
CAP SAN ANTONIO	ELZU6	Norfolk	15	2	0	0	0	0	0	0	0	0	0	0	17
STAR GEIRANGER	LAKQ5	Norfolk	31	21	0	0	0	0	0	0	0	0	0	0	52
STAR GRINDANGER	LAKR5	Norfolk	3	25	0	0	0	0	0	0	0	0	0	0	28
TAMESIS	LAOL5	Norfolk	18	13	0	0	0	0	0	0	0	0	0	0	31
SEALAND COMET	MCDZ7	Norfolk	0	22	0	0	0	0	0	0	0	0	0	0	22
COLUMBUS CANADA	P3RD8	Norfolk	20	14	0	0	0	0	0	0	0	0	0	0	34
COLUMBUS VICTORIA	P3RF8	Norfolk	21	8	0	0	0	0	0	0	0	0	0	0	29
COSCO NORFOLK	P3ZY6	Norfolk	6	4	0	0	0	0	0	0	0	0	0	0	10
ATLANTIC CARTIER	SCKB	Norfolk	49	24	0	0	0	0	0	0	0	0	0	0	73
ORKUN KALKAVAN	TCCG6	Norfolk	31	22	0	0	0	0	0	0	0	0	0	0	53
LEYLA KALKAVAN	TCCJ7	Norfolk	15	9	0	0	0	0	0	0	0	0	0	0	24
SELMA KALKAVAN	TCSX	Norfolk	21	32	0	0	0	0	0	0	0	0	0	0	53
MAERSK MISSOURI	WAHV	Norfolk	0	12	0	0	0	0	0	0	0	0	0	0	12
GEYSIR	WCZ5528	Norfolk	32	58	0	0	0	0	0	0	0	0	0	0	90
INDUSTRIAL CHALLENGER	WDHL	Norfolk	3	0	0	0	0	0	0	0	0	0	0	0	3
DELAWARE BAY	WMLG	Norfolk	20	1	0	0	0	0	0	0	0	0	0	0	21
CHESAPEAKE BAY	WMLH	Norfolk	39	52	0	0	0	0	0	0	0	0	0	0	91
NOAA SHIP ALBATROSS IV	WMVF	Norfolk	4	29	0	0	0	0	0	0	0	0	0	0	33
NOAA SHIP NANCY FOSTER	WTER	Norfolk	0	23	0	0	0	0	0	0	0	0	0	0	23
Norfolk Ships: 26	Totals:		514	478	0	0	0	0	0	0	0	0	0	0	992

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MOL VIGOR	9VVN	Oakland	0	1	0	0	0	0	0	0	0	0	0	0	1
APL TOURMALINE	9VVP	Oakland	24	16	0	0	0	0	0	0	0	0	0	0	40
APL TURQUOISE	9VVY	Oakland	13	9	0	0	0	0	0	0	0	0	0	0	22
RICHARD H MATZKE	C6FE5	Oakland	9	33	0	0	0	0	0	0	0	0	0	0	42
FRANK A. SHRONTZ	C6PZ3	Oakland	7	18	0	0	0	0	0	0	0	0	0	0	25
J. BENNETT JOHNSTON	C6QE3	Oakland	28	5	0	0	0	0	0	0	0	0	0	0	33
MANOA	KDBG	Oakland	45	32	0	0	0	0	0	0	0	0	0	0	77
WASHINGTON VOYAGER	KFDB	Oakland	1	8	0	0	0	0	0	0	0	0	0	0	9
SEA-LAND DEFENDER	KGJB	Oakland	49	27	0	0	0	0	0	0	0	0	0	0	76
MATSONIA	KHRC	Oakland	16	30	0	0	0	0	0	0	0	0	0	0	46
SEALAND PATRIOT	KHRF	Oakland	51	45	0	0	0	0	0	0	0	0	0	0	96
SEALAND LIBERATOR	KHRP	Oakland	41	42	0	0	0	0	0	0	0	0	0	0	83
CSX TRADER	KIRH	Oakland	56	43	0	0	0	0	0	0	0	0	0	0	99
COLORADO VOYAGER	KLHZ	Oakland	13	9	0	0	0	0	0	0	0	0	0	0	22
MARINE COLUMBIA	KLKZ	Oakland	62	32	0	0	0	0	0	0	0	0	0	0	94
CSX ENTERPRISE	KRGB	Oakland	563	393	0	0	0	0	0	0	0	0	0	0	956
SEALAND MERCURY	MCDW9	Oakland	26	18	0	0	0	0	0	0	0	0	0	0	44
SEALAND CHAMPION	MCDZ2	Oakland	40	6	0	0	0	0	0	0	0	0	0	0	46

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MADISON MAERSK	OVJB2	Oakland	44	7	0	0	0	0	0	0	0	0	0	0	51
MAYVIEW MAERSK	OWEB2	Oakland	25	27	0	0	0	0	0	0	0	0	0	0	52
MAERSK DAMMAM	V2OE3	Oakland	47	14	0	0	0	0	0	0	0	0	0	0	61
OOCL HONG KONG	VRVA5	Oakland	28	9	0	0	0	0	0	0	0	0	0	0	37
MOKU PAHU	WBWK	Oakland	1	18	0	0	0	0	0	0	0	0	0	0	19
GREEN COVE	WCZ9380	Oakland	1	30	0	0	0	0	0	0	0	0	0	0	31
HORIZON SPIRIT	WFLG	Oakland	66	32	0	0	0	0	0	0	0	0	0	0	98
SEALAND INNOVATOR	WGKF	Oakland	40	40	0	0	0	0	0	0	0	0	0	0	80
MAHIMAHI	WHRN	Oakland	45	40	0	0	0	0	0	0	0	0	0	0	85
LURLINE	WLVD	Oakland	10	8	0	0	0	0	0	0	0	0	0	0	18
MOKIHANA	WNRD	Oakland	48	28	0	0	0	0	0	0	0	0	0	0	76
LIHUE	WTST	Oakland	50	19	0	0	0	0	0	0	0	0	0	0	69
Oakland Ships: 30	Totals:		1449	1039	0	0	0	0	0	0	0	0	0	0	2488

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CHANG JIANG BRIDGE	3EZJ9	Seattle	56	25	0	0	0	0	0	0	0	0	0	0	81
RUBIN ARTEMIS	3FAH7	Seattle	29	19	0	0	0	0	0	0	0	0	0	0	48
LT UNITY	3FCD9	Seattle	3	0	0	0	0	0	0	0	0	0	0	0	3
GOLDEN NOVA	3FDV6	Seattle	11	4	0	0	0	0	0	0	0	0	0	0	15
EVER ULTRA	3FEJ6	Seattle	7	3	0	0	0	0	0	0	0	0	0	0	10
KURE	3FGN3	Seattle	22	0	0	0	0	0	0	0	0	0	0	0	22
ORIENTE GRACE	3FHT4	Seattle	0	21	0	0	0	0	0	0	0	0	0	0	21
EVER GRADE	3FOW2	Seattle	18	10	0	0	0	0	0	0	0	0	0	0	28
BLUE GEMINI	3FPA6	Seattle	4	64	0	0	0	0	0	0	0	0	0	0	68
ORIENTE VICTORIA	3FVG8	Seattle	0	13	0	0	0	0	0	0	0	0	0	0	13
APL KENNEDY	9VAY4	Seattle	51	34	0	0	0	0	0	0	0	0	0	0	85
IBIS ARROW	C6CU6	Seattle	19	30	0	0	0	0	0	0	0	0	0	0	49
STELLAR VOYAGER	C6FV4	Seattle	0	9	0	0	0	0	0	0	0	0	0	0	9
CORMORANT ARROW	C6IO9	Seattle	50	3	0	0	0	0	0	0	0	0	0	0	53
WESTWOOD MARIANNE	C6QD3	Seattle	62	27	0	0	0	0	0	0	0	0	0	0	89
WESTWOOD ANETTE	C6QO9	Seattle	30	0	0	0	0	0	0	0	0	0	0	0	30
WESTWOOD RAINIER	C6SI3	Seattle	56	24	0	0	0	0	0	0	0	0	0	0	80
WESTWOOD COLUMBIA	C6SI4	Seattle	36	15	0	0	0	0	0	0	0	0	0	0	51
WESTWOOD VICTORIA	C6SI6	Seattle	49	60	0	0	0	0	0	0	0	0	0	0	109
CSL CABO	D5XH	Seattle	21	12	0	0	0	0	0	0	0	0	0	0	33
PUSAN SENATOR	DQVG	Seattle	23	23	0	0	0	0	0	0	0	0	0	0	46
PENANG SENATOR	DQVH	Seattle	50	12	0	0	0	0	0	0	0	0	0	0	62
SANTA BARBARA	ELOT3	Seattle	40	14	0	0	0	0	0	0	0	0	0	0	54
WORLD SPIRIT	ELWG7	Seattle	22	34	0	0	0	0	0	0	0	0	0	0	56
UNITED SPIRIT	ELYB2	Seattle	68	50	0	0	0	0	0	0	0	0	0	0	118
ORIENTE SHINE	H9AL	Seattle	0	21	0	0	0	0	0	0	0	0	0	0	21
NORTH STAR	KIYI	Seattle	47	21	0	0	0	0	0	0	0	0	0	0	68
SKAUGRAN	LADB2	Seattle	18	48	0	0	0	0	0	0	0	0	0	0	66
STAR DOVER	LAEP4	Seattle	43	0	0	0	0	0	0	0	0	0	0	0	43
WESTWOOD BORG	LAON4	Seattle	71	53	0	0	0	0	0	0	0	0	0	0	124
WESTWOOD BREEZE	LAOT4	Seattle	46	0	0	0	0	0	0	0	0	0	0	0	46
USCGC POLAR STAR (WAGB 1	NBTM	Seattle	114	50	0	0	0	0	0	0	0	0	0	0	164
USCGC POLAR SEA WAGB 11	NRUO	Seattle	62	46	0	0	0	0	0	0	0	0	0	0	108
COLUMBINE MAERSK	OUHC2	Seattle	0	22	0	0	0	0	0	0	0	0	0	0	22
CLEMENTINE MAERSK	OUQK2	Seattle	7	0	0	0	0	0	0	0	0	0	0	0	7
AXEL MAERSK	OUUY2	Seattle	74	3	0	0	0	0	0	0	0	0	0	0	77
A.P. MOLLER	OVYQ2	Seattle	0	2	0	0	0	0	0	0	0	0	0	0	2
CHARLOTTE MAERSK	OWLD2	Seattle	0	23	0	0	0	0	0	0	0	0	0	0	23
CORNELIA MAERSK	OWWS2	Seattle	21	0	0	0	0	0	0	0	0	0	0	0	21
SUSAN MAERSK	OYIK2	Seattle	2	0	0	0	0	0	0	0	0	0	0	0	2
SOROE MAERSK	OYKJ2	Seattle	37	28	0	0	0	0	0	0	0	0	0	0	65
SALLY MAERSK	OZHS2	Seattle	57	0	0	0	0	0	0	0	0	0	0	0	57

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SINE MAERSK	OZOK2	Seattle	0	38	0	0	0	0	0	0	0	0	0	0	38
UBC SAIKI	P3GY9	Seattle	2	41	0	0	0	0	0	0	0	0	0	0	43
NORDMAX	P3YS5	Seattle	36	0	0	0	0	0	0	0	0	0	0	0	36
APL JAPAN	S6TS	Seattle	73	50	0	0	0	0	0	0	0	0	0	0	123
VLADIVOSTOK	UBXP	Seattle	40	36	0	0	0	0	0	0	0	0	0	0	76
HATSU ETHIC	VQFS4	Seattle	41	17	0	0	0	0	0	0	0	0	0	0	58
OOCL CALIFORNIA	VRWC8	Seattle	24	23	0	0	0	0	0	0	0	0	0	0	47
ISLA DE CEDROS	VRXU2	Seattle	85	57	0	0	0	0	0	0	0	0	0	0	142
HATSU ELITE	VSJG7	Seattle	11	6	0	0	0	0	0	0	0	0	0	0	17
HATSU ENVOY	VSQL9	Seattle	49	43	0	0	0	0	0	0	0	0	0	0	92
HATSU EXCEL	VSXV3	Seattle	14	13	0	0	0	0	0	0	0	0	0	0	27
MIDNIGHT SUN	WAHG	Seattle	47	42	0	0	0	0	0	0	0	0	0	0	89
NATHANIEL B. PALMER	WBP3210	Seattle	69	33	0	0	0	0	0	0	0	0	0	0	102
GREAT LAND	WFDP	Seattle	63	2	0	0	0	0	0	0	0	0	0	0	65
PRESIDENT TRUMAN	WNDP	Seattle	66	43	0	0	0	0	0	0	0	0	0	0	109
PRESIDENT JACKSON	WRYC	Seattle	81	58	0	0	0	0	0	0	0	0	0	0	139
PRESIDENT POLK	WRYD	Seattle	59	51	0	0	0	0	0	0	0	0	0	0	110
PRESIDENT ADAMS	WRYW	Seattle	53	42	0	0	0	0	0	0	0	0	0	0	95
WECOMA	WSD7079	Seattle	0	27	0	0	0	0	0	0	0	0	0	0	27
RUBIN PEARL	YJQA8	Seattle	83	23	0	0	0	0	0	0	0	0	0	0	106
HATSU EAGLE	ZNZH6	Seattle	10	0	0	0	0	0	0	0	0	0	0	0	10
Seattle Ships: 63		Totals:	2232	1468	0	0	0	0	0	0	0	0	0	0	3700

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
POLAR TEXAS	KNFD	Valdez	21	15	0	0	0	0	0	0	0	0	0	0	36
POLAR ALASKA	KSBK	Valdez	26	5	0	0	0	0	0	0	0	0	0	0	31
Valdez Ships: 2		Totals:	47	20	0	0	0	0	0	0	0	0	0	0	67

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total Ships: 418		Totals:	13331	8829	0	0	0	0	0	0	0	0	0	0	22160

Meteorological Services

U.S. Port Meteorological Officers

Headquarters

Robert A. Luke
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